John Cranford,
M. D.

THE

MEDICAL REPOSITORY.

VOL. II.

Molli paullatim flaveſcet campus ariſta,
Incultiſque rubens pendebit ſentibus uvâ.
Et duræ quercus ſudabunt roſcida mella.

VIRGIL.

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1798.

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ADVERTISEMENT.

THE list of Subscribers, which accompanies the present Number of the REPOSITORY, is less complete than the Editors expected. But, in addition to unavoidable omissions from the lateness of the returns from some parts of the country, several names do not appear which would do honour to any publication. This happens from the circumstance of their having been annexed to the subscription list since the printing of that now delivered was completed. It was deemed proper to notice this publicly, that the Editors might be exculpated from all possibility of a charge of indecorum towards those whom they have numerous reasons to respect.

New-York, July 31, 1798.

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MEDICAL REPOSITORY.

VOL. II.--No. I.

ARTICLE I.

A CASE *of diseased* OS INNOMINATUM *successfully treated.*

By E. A. HOLYOKE, *M. D. of Salem, Massachusetts.*

CAPTAIN S—— F——, of a firm, sound constitution, when about forty years old, on the 14th of February, 1783, as he was walking upon the ice, at that time covered with a light snow, suddenly fell, with his whole weight and great force, full upon the left os innominatum: the shock was great, and the pain, for the moment, very considerable; but as it soon ceased to be troublesome, it was entirely neglected. About three or four weeks after, he began to feel a pain in the injured part, extending down to the sole of his foot, which growing daily more and more uneasy, induced him to attend to it. By the latter end of April he could walk but very indifferently, even with the help of his cane; and every motion aggravated the pain to a great degree. And when in bed, he found himself unable to lie on his left side more than a few minutes; and was obliged to place the limb in a certain position, in order to obtain any tolerable rest, which, with all his care, was much interrupted. The whole outside of the leg was now so tender, that he could ill bear even a slight rubbing on the part with his own hand. He used to resemble the sensation he felt down the whole outside of the limb, to what would have been produced by putting a ragged wire up and down through the sinews.

These complaints so much resembled rheumatism, that the medicines prescribed by his physician were adapted to that conception of the case. Mercurials and antimonials, with guaiacum, &c. internally, and embrocations of tinct. cantharides, opodeldoc, &c. externally, were employed, but without any relief: he lost his appetite, his flesh, and his strength; and grew much dejected and alarmed at the apprehension of incurable lameness.

I was now, about the middle of May, called in to advise with the gentleman who had hitherto attended him, from whom, and the patient, I had the above state of the case.

Upon examining the hip, we found, at first view, the spine of the left ilium turning more outwards, and much more prominent than the sound one; the left hip evidently much higher than the right; the trunk of the body leaning over to the right, so as that there was an utter inability to stand erect.

In addition to the medicines he was taking, we advised to a blister upon the part: a large vesicatory was accordingly applied, so as to cover almost the whole os innominatum. This application had an agreeable effect, the symptoms being all somewhat relieved. A little before this, I had met with Mr. Pott's publication, in which he recommends the use of setons and issues, in cases of paralysis of the lower limbs, from distortion of the spinal vertebræ. It occurred to me, that there was an analogy in the two cases, sufficient to induce us to a trial of his remedy; especially as the blister, which has an action of a similar kind, was found to give a sensible alleviation. As, however, we expected the arrival of a physician of eminence, from Boston, the matter was postponed till we had his opinion upon it. He accordingly came the next day.

We now examined the parts again with great attention, and were convinced, by the most accurate admeasurement we could make, after placing his heels exactly together, and then causing him to stand up as erect as possible, that the spine of the left ilium was precisely two inches and four-tenths higher from the floor than the other, and that it projected much further out from the spina dorsi; and that the whole bone on that side was much enlarged; and that the trunk of his body leaned over to the left, in an angle of about 25 degrees from the perpendicular: nor could he, by any exertion, stand more upright; and this effort, he told us, was so painful, that he could scarcely endure it.—My proposal was adopted, and it was now agreed to apply a caustic upon the part, and to keep up the discharge till we had made a fair trial of its effects; to continue the use of the mercurial and antimonial medicines, as advised by Dr. John Fothergill, in ischiatic cases, and still apply the warm embrocation: and, by the advice of another gentleman of the faculty, Dr. Home's volatile liniment, spread upon leather, was applied to the whole outside of the limb.

The caustic was applied the next day, and an eschar produced of the bigness of a crown piece. As soon as the eschar cast off, a piece of wax, of the bigness of a large coat-button, was made use of, by way of pea, to keep the ulcer open.

The good effects of this procedure soon grew sensible; the pain and stupor grew less and less daily; and, in the course of eight or

ten weeks, he could walk with ease about the house without his cane; the distortion of the hip-bone diminished, and the difference of the height of the hips, which had been about two inches and a half, was, by July or August, reduced to half an inch only, and by September, was so far removed, that no difference was discernible; his lameness was comparatively trifling, being able to walk two miles at once without difficulty.

He still went on mending; but as the winter approached, he complained of pain and numbness on the outside of the limb, when exposed abroad to the cold: and as we were of the opinion that a warmer climate might accelerate his recovery, we advised him to spend the winter in the West-Indies. He had now for some months laid aside all his medicines, except that he still wore the liniment mentioned above, on the outside of his leg, on account of the increasing coldness of the weather. We advised the ulcer in that hip, however, to be kept open during his voyage, at all events. He found the warmth of a more southern atmosphere very agreeable; and when he returned the following June, informed us he had been gradually mending during the voyage, and though not entirely free from all uneasiness, the numbness being still a little troublesome, especially in cold damp weather, yet in good health and spirits. We advised him to keep the ulcer open still, which was agreeable to his own ideas of the matter, as he, as well as his physicians, attributed his cure chiefly to the caustic. By degrees he recovered perfect health and soundness; when, finding it of no further use, he threw out the wax, and suffered the ulcer to heal.

IN reciting this case, I have not suggested any suspicions, though I had many at the time, that the appearances might, at least in part, be owing to a tumefaction of the glands of the acetabulum, which furnish the synovia of the joint; because it was a matter of uncertainty, and because the evident enlargement of the hip bone seemed adequate to the observed appearances; yet it is certainly very possible such a tumefaction might take place, and if it did, would naturally lengthen the limb: as we find not unfrequently, children and young persons afflicted with a dreadful disease in consequence of such injured or obstructed glands; the patient commonly complains first of lameness in the whole limb, though the seat of it is often supposed to be in the sinew; but upon a careful examination, the lame limb is found to be longer than the other; and when this is observed to be the real state, the origin of the disease is, I believe, commonly referred to a morbid state of the glands of the acetabulum; which, if not

remedied in season, frequently terminates, as surgeons know but too well, in abscesses, which produce fistulous and often carious ulcers, incurable lameness, luxation of the femur, hectic fever, and sometimes death. If, now, such a diseased state of these glands did really exist in Captain F——'s case, in consequence of the injury received by his fall, does not the fortunate event in his case lead us to hope, that the like application of a caustic to the part, in children under the predicament now mentioned, made as soon as the lengthening of the limb becomes sensible, might be attended with happy effects, and stop the progress of a mischief, which, neglected, soon becomes remediless?

ARTICLE II.

AN EASY AND CHEAP METHOD OF PREPARING SAL AERATUS.*

By E. A. Holyoke, *M. D. of Salem, Massachusetts.*

SAL Aëratus, or the salt formed of vegetable alkali saturated by fixed air, (carbonic acid) is, on many accounts, so useful, that a communication of an easy method of preparing it, at little or no expence, may be beneficial. The following may therefore be acceptable, if it be not already commonly known. I have myself prepared this salt for 10 or 12 years past in this way, and it is now kept in our apothecaries shops.

Take a large wooden box,† bore eight or ten holes, half an inch in diameter, in the side of it, just below the lower edge of the cover, at nearly equal distances all round; bore also as many holes in the circular bottom of the box, close to the edge of it: then take another box of the same kind, but of a smaller diameter by half or three quarters of an inch; place this in the larger, and to keep it steady, thrust three or four wooden wedges between the two boxes. The two boxes‡ being thus prepared, fill the inner one with the purest salt of tartar, or clean well calcined pearl-ashes, or any clean pure fixed vegetable alkali: put its cover on the outer box, leaving the inner one uncovered; sling this double box thus filled, with a cord, and suspend it in a distiller's vat or cistern, while the wash is fermenting, a little above the liquor, or in an empty cistern, if it has been much used, and still retains the fixed air: let it remain in this situation for six weeks or two months, or longer if it is not wanted; let it then be taken out, and the salt now fully saturated with the acid, be exposed to the sun and air to dry.

The salt thus prepared, does neither effloresce nor deliquesce in the open air, and for all common purposes is, I believe, equal to that prepared by crystallization.

Note. The pearl-ashes had better be put into the box in moderate sized lumps, than in powder, that the air may have free access to it.

* Carbonate of pot-ash.

† I make use of a common cylindrical box, about nine or ten inches in diameter, and between five and six inches deep.

‡ The design of the outer box is merely to prevent any dust or dirt from getting into the salt, while the holes in it suffer the fixed air to be freely admitted.

But if any chuse to have this salt in its most perfect form, let him proceed in this manner.

Dissolve as much of the clean vegetable alkali, in boiling rain or other pure water, as possible; filter the solution through paper, pour it into a jar of stone or earthen ware, cover the vessel in such a manner as that the air may have access to it, but so as to exclude all dust or foreign matter. Let it be hung by a cord in a fermenting vat, or cistern, for a month or two, in which time, a great many crystals will be formed: from which the superfluous liquor may be poured off, and the salt dried in Hippocrates' sleeve. The superfluous liquor may be again saturated with more alkali, and again exposed to the air in the cistern, without any loss. This last is, without doubt, the most perfect mode of preparation, and I have sometimes made use of it; but as it is much more troublesome to make than the other, and as the other, for all medicinal purposes, is perhaps equal to this, I have for the most part employed it.

This salt is much more tolerable to the palate, and may be taken in larger doses than the naked alkali; and as it is decompounded by vegetable acids as well as the mineral, it may be exhibited, instead of the alkali, in perhaps every case where the latter is proper, unless the fixed air is judged improper.

It is much superior to common alkali in forming Riverius' antiemetic effervescing draught, as it contains a much larger proportion of fixed air (in which the principal virtue of that medicine is supposed to reside) than the mildest fixed alkali, and is at the same time much more palatable.

I commonly direct about ʒ ii or rather more of this salt, to be dissolved in ℥ iii of fair water; a large spoonful of this solution, added to the same quantity of good vinegar, or lemon juice, at the instant of swallowing it, makes an agreeable dose. But the taste of this solution is so mild, that if the prescriber chuses, a spoonful of it may be swallowed alone first, and as much vegetable acid immediately upon it, in which case none of the gas will be lost.

When acidity abounds in the first passages, a little of this salt added to any bitter infusion, or the dry salt added to powder of columbo, or any peptic powder, is an effectual antacid.

In calculous cases, this salt is recommended by writers, particularly by the celebrated Dr. Cullen, in his Materia Medica, vol. ii. ch. 13. as being an happy expedient for conveying larger quantities of alkali into the stomach, than it can bear in its natural state.

Hitherto the common mode of preparing the salt for this purpose, I believe, has been by impregnating a solution of fixed alkali with fixed air, by means of Dr. Nooth's machine, but any one who has prepared the medicine in both ways, will readily give the

most decided preference to that above described, on account both of ease and cheapness.

It is scarcely worth mentioning, that, for œconomical purposes, such as promoting fermentation in dough for bread or cakes, where pearl-ashes is commonly employed, the sal aëratus is much to be preferred, on account of the much larger quantity of fixed air eliminated in the process.

ARTICLE III.

A Letter from the Rev. JEDIDIAH MORSE, *D. D. to Mr. Smith, including a Tohographhical Account of Charlestown, (Massachusetts) with Bills of Mortality, &c. &c.*

DEAR SIR, *Charlestown, February* 10, 1798.

AGREEABLE to my promise, I now send you a *bill of mortality*, &c. for this town, to which I have prefixed such a description of the town as I thought necessary, to enable you to judge of its comparative advantages and disadvantages in point of health, and have annexed some explanatory remarks.

A considerable part of the materials for these bills was furnished by Dr. JOSIAH BARTLETT, the physician of this town, who has been in the habit of keeping a good account of the births and deaths within the limits of his practice. His bill of mortality I have carefully compared with my own, and one kept by another gentleman in town, so that I imagine the bills, in all respects, are as accurate as could be desired.

If this kind of information falls within your plan, and this communication should be thought deserving a place in your valuable Repository, you have my leave to publish it. I wish, should it be published, it may invite similar communications from different parts of our country, that so, in a course of years, a mass of materials may be collected, from which some skilful person may be enabled hereafter to compile tables, with accompanying remarks, which shall shew what are the prevalent diseases in the United States—the probable causes of the prevalence of different diseases in different places, and at the different seasons of the year—the natural increase of inhabitants—the comparative healthfulness of the several towns and larger districts in the United States, &c. &c. and, in general, the probability of the continuance of life in the several States. With great esteem, I am, dear Sir,

your most obedient servant,

JEDIDIAH MORSE.

A Bill of Mortality, and of the Births, Marriages, and Baptisms, and a List of rateable Polls, for the town of Charlestown, (Massachusetts) for the years 1789 *to* 1797, *both inclusive: to which is prefixed, a Description of the Town.*

DESCRIPTION OF CHARLESTOWN.

CHARLESTOWN is a maratime town, of an irregular form, extending seven and a quarter miles in a N. N. W. and S. S. E. direction, of unequal breadth, on an average, about one

mile. The scattered inhabitants in the northern part of the town, constituting about a tenth part of the whole number, are set off to the parishes in the adjoining towns, and are not included in the following bills.

The compact part of the town is on a *peninsula*, of a pyramidical form, (the base of which is Charles river) about one mile and a quarter in length, and about half a mile in breadth. On this peninsula, (including about a dozen houses without the neck, which belong to the parish) are about 260 dwelling-houses, all (two excepted) of wood. There is but one house for public worship in the town, and that is for congregationalists, situated near the bridge, in N. Lat. 42° 23′ 26″. There was but about half the above number of houses in 1789. The number of inhabitants will be best ascertained from the list of rateable polls inserted among the following tables.

There are, on the peninsula, two rope-walks, an alms-house, a rum distillery, a dye-house, two tallow-chandleries, four slaughter-houses, and eight tanneries and leather-dressers' works. The slaughter-houses and leather-dressers' works are situated on tide-water, and, in general, attention is paid to their cleanliness.

The peninsula is connected on the *south* with Boston, by a bridge 1500 feet in length, over Charles' river. On the *north* it is joined with the Main, by a narrow artificial neck or isthmus, which, at high water, in spring tides, is but a few rods wide. On the *east*, it is washed by *Mystic*, a salt water river between two and three hundred rods wide. To the south-east, spreads Boston bay and harbour: to the south-west another broad bay, which receives Charles' river, and projects northward along the *west* side of the town. Across the northern part of this bay, a dam was thrown many years ago, and mills erected upon it, which were destroyed with the town in 1775; but have been lately re-built. The extensive body of marsh, which, in consequence of this dam, is kept longer overflowed, being *salt*, occasions no injury to the health of the inhabitants.

Besides being encompassed with tide water, the peninsula is, in other respects, well situated for health; being open to the sea and land breezes, and charmingly diversified with gentle hills, which overlook Boston and its harbour, and beautiful islands, and the adjacent towns in every direction, and has neither stagnant waters nor offensive marshes.

The town is intersected by *eleven* irregular streets, besides lanes and alleys. The main street, which is 50 feet wide and paved, runs through the center of the town, north and south, from the bridge to the neck. On this street, within a few rods of the bridge, is a spacious square, surrounded with handsome houses and stores. The water in the numerous wells in town, is pure and

good. The trees were all destroyed with the town in 1775: many have been since planted, but are yet small, and are not thrifty.

In the months of April and May, easterly winds prevail, which are chiefly unelastic, and fraught with sea vapour, and are disagreeable and depressing to all, and pernicious to invalids, to such especially as are afflicted with bilious and hectic complaints, which are the most prevalent diseases in the town. The inhabitants are subject to no endemical diseases. Scarcely a year passes without several instances, in the months of August, September, and October, of malignant bilious fevers; but these have generally happened in the neighbourhood of slaughter-houses, or leather-dressers' work shops, where there is more or less of putrid matter.

At those periods when the *small-pox* has visited Boston, this town has shared in the same calamity. The last time it prevailed was in the year 1792, in the months of September and October, when 1352 persons were inoculated, of whom nine died; twelve took the disease the natural way, of which number three died. Of the whole number inoculated, 879 were inhabitants of the town, of whom nine died; the others were persons from the vicinity, who availed themselves of so favourable an opportunity of taking the disease by inoculation.

The destruction of this town in 1775, reduced many of its affluent inhabitants to great straits and difficulties, and very considerably increased the number of its poor. How far this circumstance, connected with that depression of spirits which is ever the effect of a sudden loss of one's all in this world, may have operated to increase the bills of mortality, cannot be determined.

BILL OF DISEASES.

DISEASES.	1789	1790	1791	1792	1793	1794	1795	1796	1797	Total.
Apoplexy		1			1	1		1	1	5
Atrophy	1		1							2
Cancer	1	1				1			2	5
Canker	2	3	1	1	3	1	4	9	3	27
Cholera Dyſenterica					4					4
Conſumption	5	7	4	3	4	3	4	10	7	47
Convulſions	1	1	1	1	2	2	2		1	11
Dentition	1	1								2
Diarrhœa					2					2
Dyſentery				1		2	1	3	2	9
Dropſy	1		1		1	1	2	1	1	8
Eriſipelas			1							1
Fits								5	4	9
Fevers. Bilious	1		1					2		4
Fevers. Inflammatory					1		2			3
Fevers. Nervous	1			2		2	1	3	3	12
Fevers. Puerperal						1				1
Fevers. Putrid		1	4		1	1	1	1	2	11
Fiſtula in Ano									1	1
Gangrene			1		1			1		3
Gout	1				1					2
Hæmoptiſis					1					1
Hepatitis				1		1			1	3
Hernia	1									1
Hooping Cough			4					1		5
Hydrocephalus		2					1	2		5
Influenza	1									1
Lues Venerea								1		1
Meaſles		4								4
Old Age		3		4	3	2	2	5	5	24
Palſy	1	1		1		1	4		1	9
Phthiſis Pulmonalis	3	3	4	5	4	1		4	5	29
Phrenitis									1	1
Quinſey					1		3	1	2	7
Scarlatina Anginoſa							4	2		6
Scrofula		1								1
Small-pox				9						9
Still born	1	1	2	4	2	2	2	5	3	22
Sudden						3	2			5
Worms		1					2		1	4
Caſualties. Drowned		3						1	1	5
Caſualties. Fall		1								1
Caſualties. Frozen								1		1
Caſualties. Overlaid			1				1			2
Caſualties. Poiſoned						1				1
Caſualties. Suffocated			1							1
Died abroad								6	1	7
Total each year	22	35	26	32	32	26	38	65	49	325

Total number of *deaths*, in nine years, 325—*births*, 576—*baptiſms*, 310—*marriages*, 115 in 8 ycars and 4 months.—*Remark.* About one quarter part of the whole number who have died have, it appears, died of *hectic complaints*.

An Account of the quantity of rain which fell in Charlestown in six years, *from* 1792 *to* 1797, *both inclusive. By* JOSEPH BARRELL, *Esquire.*

	1792	1793	1794	1795	1796	1797	Average.
January	550	3587	5671	2677	2390	2670	2924$\frac{1}{6}$
February	1500	3393	1423	1048	2212	4330	2317$\frac{1}{6}$
March	5212	5905	4068	2916	2526	5240	4311$\frac{1}{6}$
April	3114	1791	829	7113	722	3805	2901
May	2440	2840	831	3609	3915	3405	2840
June	2171	2022	2542	2087	1222	2090	2022$\frac{2}{6}$
July	1825	1212	2132	5357	2285	2962	2628$\frac{5}{6}$
August	1690	1087	4035	6077	1455	5090	3239
September	3482	2860	1782	5266	4800	1300	3248$\frac{2}{6}$
October	2020	2272	4175	4088	1995	5135	3280$\frac{5}{6}$
November	6324	4248	1364	2201	1020	3055	3035$\frac{2}{6}$
December	130	1119	2257	3198	1225	2100	1671$\frac{3}{6}$
Total	30,488	32,336	31,109	45,637	25,707	41,182	34,429

REMARKS.

Mr. Barrell's house, near which is his rain-gauge, is well situated to determine the quantity of water that falls, it being elevated about 60 feet above the level of high water mark, and is distant from any other houses, so that no water can fall into the gauge, but that which comes directly from the clouds. The water in the gauge was measured generally as soon as the rain was over, so that none might go off in evaporation.

Mr. Barrell's rain-gauge measures to the $\frac{1}{1000}$ part of an inch, as 1000 lines make one inch.

Nothing is allowed for the *snows* which fell in winter. The water in them may amount perhaps to an average of six or seven inches annually.

BILL OF AGES.

Years.	Still born.	Und. 1 yr.	Betw. 1&2	Betw. 2&5	Bet. 5&10	Be. 10&15	Be. 15&20	Be. 20&25	Be. 25&30	Be. 30&40	Be. 40&50	Be. 50&60	Be. 60&70	Be. 70&80	Be. 80&90	B. 90&100	Total.
1789	1	3	1	2		1				1	3	3	4	3			22
1790	1	7	5	3					1	4	2	4	3	1	3	1	35
1791	2	7	2	2		2	1	1	2	1	2	1	1	2			26
1792	4	2	3	3	1	2		1	2	2	1	5	1	1	3	1	32
1793	2	6	9	2		1	1	1			2	2	2	2	2		32
1794	2	4	1	1	1	1	2	2		3	2	2	2	1	1	1	26
1795	2	6	1	7	7		1			4	2	1	2	5			38
1796	5	15	8	2	2	3	1	*6	*4	3	3	2	3	5	1	2	65
1797	3	9	2	3	2	1	2	2	4	5	4	3	1	5	2	1	49
Total.	22	59	32	25	13	11	8	13	13	23	21	23	19	25	12	6	325

* Five of these, who were young men, died abroad.

Remarks. From the above bill of ages it appears, that 138, out of 325, (the whole number of deaths) were under the age of *five years; i. e.* about two-fifths of the whole: and that 43, or nearly one-eighth of the whole, were upwards of *seventy* years old.

MONTHLY BILL.

Months.	1789	1790	1791	1792	1793	1794	1795	1796	1797	Total.
January				2	1	3	5	7	3	21
February	2	2	3	3	2	2		9	5	28
March		2	3		3	1	1		6	16
April	3	3	2	2		3	1	1	4	19
May	1	3	1	3	1		2	2	2	15
June		6	1			1	3	3	4	18
July	1	1	1	3	2	1	1	6	4	20
August	3	4	3		10	3	3	9	2	37
September	3	5	1	7	5	3	5	14	5	48
October	3	4	4	10	3	5	7	5	7	48
November	1	2			3	3	5	6	3	23
December	5	3	7	2	2	1	5	3	4	32
Total	22	35	26	32	32	26	38	65	49	325

Note. Auguſt, September, October and December are the moſt fatal months.—The year of the greateſt mortality (1796) but little more than half the quantity of rain fell as in the year preceding, and conſiderably leſs than in any of the nine years included in the theſe tables.

Table of Births, Marriages, &c. for nine years.

Years	Births. Males	Females	Total	Marriages.	Baptisms.	Rateable Polls.* In whole town.	In pariſh
1789	30	22	52	2†	21	366	330
1790	20	20	40	8	20	350	315
1791	26	21	47	10	30	352	317
1792	32	14	46	12	21	360	324
1793	33	31	64	15	48	383	345
1794	32	32	64	14	42	489	440
1795	40	37	77	12	44	562	502
1796	50	33	83	23	28	603	543
1797	62	41	103	19	56	609	544
Total	325	251	576	115	310		3660

* Males only, from 16 years old and upwards, are included in the rateable polls.—As this bill comprehends that part of Charleſtown only which is within the pariſh, which includes about a dozen families without the peninſula, there muſt be a deduction of about ten per centum from the number of rateable polls, in order to reduce that article within the limits of the others.

The number of rateable polls, to the whole number of inhabitants, in 1790, (when the cenſus was taken, and the whole number of inhabitants was found to be 1583) was as 1 to 4½. The proportion ſince, owing to a great acceſſion of mechanics, &c. is thought to have been as 1 to 4. Admitting theſe *data* to be juſt, it appears, that, on an average for 9 years, 1 in 45 of the inhabitants of this town have died.

The natural increaſe of the pariſh, in nine years, has been 251: the increaſe by immigrations has been much greater than the natural increaſe.

† From Auguſt of that year.

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ARTICLE IV.

THEORY OF PUERPERAL FEVER.

Communicated in a Letter to the Editors of the Medical Repository, by Dr. JOHN BRICKELL, *of Savannah.*

DURING my course of anatomical studies, which continued several years, I had some valuable opportunities of dissecting women who died of puerperal fever; and upon perusing treatises written expressly on this subject, by the British physicians, Denman, Leake, Hulme, White, and Young, I readily perceived such a mixture of truth, error, and misapprehension, as convinced me that they had examined this business too slightly, and rashly made up their opinions from partial and defective premises. One having found marks of inflammation in the epiploon, pronounces the disease an omentitis; another, in opposition, declares it an enteritis, having found the peritonæal coat of the intestines inflamed; but Dr. Young ridiculously mistakes the effect which sometimes takes place for the cause, declaring it a typhus.

The following *rationale*, being actually deduced from nature, viewed in a variety of aspects, will, I hope, present an investigation that may place this question in a clear light.

From the time of conception to the moment of parturition, the increasing bulk and weight of the uterus pressing on the abdominal vessels, forms an increasing resistance to the motion of the blood there; and this resistance is arrived at its maximum the moment before delivery. When delivery takes place, the resistance to the motion of the blood is at once removed; and the abdominal parts, having been long on the stretch, are now in a state of relaxation; so that if the weight of the infant, with its concomitants, be=W, and the relaxation of the abdominal parts=R, then the diminution of resistance to the impetus of the blood towards the abdomen, will be=W+R. This diminution of resistance increases the blood's velocity *in exactly the same proportion*, as is demonstrated in the first book of Sir I. Newton's Principia, Lex iii. and Schol. Corollar. 6. *Superatâ resistentiâ, vis redundans accelerationem sibi proportionalem producet.* So that the blood's velocity is now increased by an addition of=W+R.

Moreover, the resistance to the motion of the blood in the ascending aorta being unaltered, while that in the descending branch of the same artery is diminished, the heart, governed by hydraulic principles, propels this fluid with most velocity, and in greatest

quantity, to the abdomen, the direction in which there is least resistance; and thus the brain collapses by having its circulating fluid turned downwards, in greater or less quantity, often producing syncope, and sometimes spasms, from the irregular oscillations of the nerves, and a want of libration in the system. Let the quantity of blood circulating in the lower arteries be=Q, and the amount of that, diverted from the aorta ascendens, be=D, then the quantity impelled into the abdomen will be increased to Q+D: but the quantity multiplied into the increased velocity will give the increased momentum, or force, with which it moves, which will be equal to W+R×Q+D.

This sudden and impetuous influx of the blood, so increased in quantity and velocity, gives it an increase of force which distends the finer vessels of the abdomen more than usual, and (as in the tunica albuginea of an inflamed eye) carries it beyond the limits of circulation assigned to it by nature. Arteries, fitted to convey a small quantity of blood only, are now, by the *impetus a tergo*, distended and surcharged by an unusual increase of their contents; and vessels, adapted for the circulation of finer fluids (whose diameters are too small for the admission of blood globules), are stretched by the momentum of the circulation, and blood is propelled into them. The unusual distention of the extreme vessels produces stimulus; stimulus produces excitement; excitement produces inflammation; and, in consequence, fever. The inflammation will be more or less extensive, and its concomitant fever, more or less violent, in proportion to the force of the acting causes.

A due consideration of these circumstances will explain the various appearances to be found in women who die of puerperal fever. Every part supplied by the descending aorta is liable to be attacked with more or less severity, according to its structure, situation, and the constitution and peculiar circumstances of the patient. When a plethora exists in a woman of lax fibre, the highest degree of danger is to be apprehended, especially in chilly damp weather, which weakens the system, and increases its excitability: on the contrary, when the fibre is elastic, unaccompanied by plethora, especially in dry temperate weather, which is favourable to the recovery of the tone of the system, the danger is least—and the infinite variety of gradations between these two extremes, produce an equal number of differences in the state of this disorder: so that a discerning physician, who knows the constitution and circumstances of the patient, making due allowances for her equanimity or unsteadiness of temper, may calculate pretty exactly, *a priori*, the quantum of danger to which she may be liable.

From what has been said, it is evident, that the blood is the great

instrument of danger, from its *excess* in the abdomen, and its *defect* in the head; its excess producing fatal inflammation and fever, and its defect producing syncope, and spasms, that sometimes carry off the patient soon after delivery: our great attention, therefore, ought to be directed to the regulation of its motions, so as to detach from the abdomen the superabundance, and lessen its momentum there; and to restore to the brain the quantity diverted from it, and which is necessary to remove its collapse, and re-establish the libration of the nervous system.

For this purpose a broad bandage or two may be placed under the woman, ready to be properly tightened over a small pillow on the abdomen, as soon as delivery is affected: to serve as an artificial pressure and restraint on the influx of the blood (instead of the uterine pressure before the birth), and the abdomen ought to be elevated above the horizon, and the head depressed, that the velocity of the blood may be checked by its gravity, and its return to the head accelerated by the same cause. If cordials are given before this, the heart will be stimulated to act with more vigour, the abdomen will be more filled with blood, and the head more emptied; and so the danger increased.

Should enteritis, peritonitis, epiploitis, or any other inflammation ensue, I apply the antiphlogistic means; but with reserve, on account of the natural discharges. I sometimes draw blood from the arm; and, in cases of extreme violence, I have repeated this operation three times in one day, with the happiest effects.

I once dissected a woman who died of a most violent puerperal fever. The whole surface of the peritonæum, strictly so called, as well as the parts of it which give the exterior coats to the intestines, uterus, bladder, &c. had, with other marks of high inflammation, a coat of pus, like that observed in the corner of an inflamed eye, and as thick as broadcloth.

As I write for men, I do not find it necessary to repeat the particulars to be found in every practical treatise: my principal aim being to establish a just theory, which must be productive of a reasonable practice.

Should this little essay contribute to lessen the sufferings of the fair sex, or save any of their precious lives, it will make me happy.

Wishing all success to your useful and commendable labours, I am, Gentlemen, very respectfully, your fellow-citizen,

JOHN BRICKELL.

Savannah, March 20, 1798.

ARTICLE V.

Abstract of a Dissertation on the SICK HEAD-ACH, *read before the Medical Society of Hartford County, Connecticut, September*, 1797, *by Dr.* NATHANIEL DWIGHT.

THE Author of this Dissertation, after noticing the general silence of medical writers on the subject of which he treats; that Dr. Fothergill alone has formally considered it; that the *Sick Head-ach* is a disease of uncommon severity, and commonly supposed incurable; that, therefore, a remedy adequate to its radical cure must deserve to be highly valued; and that the efficacy of the one which he shall propose, can be verified by many persons, and, in particular, by Drs. Fish and Cogswell, of Hartford; proceeds to a description of the disease.

"In the morning, when the patient first awakes, he feels a pain in the head; sometimes fixed over one, and sometimes over both eyes. Sometimes it is in a different part of the head; not unfrequently immediately under one or the other parietal bone; and often it is in the region of the occiput. In some instances it is wandering; in others it is fixed. But ere long it spreads from its first situation so as to affect the whole head; though it remains most severe in the part originally affected. This pain is always, from the first, attended with universal languor; and generally, at the first, these feelings are unattended by any nausea. But, from the beginning, there is a total loss of appetite; an aversion to every flavour, even to those which are at other times the most grateful; an indisposition to move; a desire, without the power of sleeping; and coldness over the whole frame, more particularly of the extremities. In this situation, light becomes very irksome, and likewise every effort to converse.—These are the most obvious symptoms of the disease, in its commencement; but, sooner or later, it progresses much in the following manner.

"From an aversion to food, the stomach feels an uneasiness which is indescribable, but speedily arises to a greater or less degree of nausea. In some instances the nausea soon becomes sufficiently strenuous to excite a voluntary retching to vomit; which, if it is effected, generally affords sudden relief, to such a degree that the patient readily falls into a sleep, from which he awakes well—complaining only of a soreness about the head, which commonly subsides in a few hours. In other instances the nausea becomes very distressing, but does not produce a retching. In these cases, the disease generally continues much longer, and is, perhaps, not the less painful. In some persons, its course is finished in

twenty-four hours; in others, not under forty-eight; and in some, it continues even longer.

"However, whether the nausea produces vomiting or not, from its first accession, the pain in the head becomes more severe and intolerable; and, in this way, the pain and nausea operate mutually as cause and effect.

"From the first perception of uneasiness in the stomach, the spirits begin to flag. They grow more and more depressed, until cheerful thoughts and feelings fly away, and the patient conceives himself the most wretched of human beings, and feels as if he were never to be otherwise.—What, perhaps, is a little singular, is, that the intellect, during this severity of pain, is peculiarly clear, precise, and capable of making the most minute distinctions, upon intricate subjects. And these operations of the mind, though very painful, are wholly beyond controul; nor, in these moments of depression, though reason suggest the folly of despair, and the fallacy of the belief which it inspires, will the feelings assent to its suggestions.

"The symptoms now enumerated are those which most usually attend the *Sick Head-ach*. But there is some variety in this disease which merits notice. This complaint is sometimes attended with a distressing *vertigo*, from its commencement; which is not an usual symptom in common cases. In other instances, it comes on with a languor, as is usual, but the languor precedes the pain in the head, as well as the nausea; and, during its continuance there, is an obscure misty appearance, fluctuating over one or other of the eyes, for the space of twenty or thirty minutes. This obscurity then vanishes, the vision becomes as clear as usual, and, for a short time, the patient feels a little encouraged with the prospect of getting well. But this hope is transient. A small, but fixed pain, soon succeeds the obscurity of vision, over the opposite eye to the one which was thus affected. This pain is at first small, but deep seated. It increases pretty rapidly, until, in a short time, it becomes excruciating; and the preceding symptoms are, in general, like those heretofore described in a common case of Sick Head-ach. The first of these two varieties is commonly called the *Giddy*, and the last the *Blind*, Head-ach.

"Those who are subject to this disease have it return upon them periodically. But the intervals between the accessions are not of equal length in every instance; nor does the disease return after stated periods, uniformly, in the same individual. Upon some persons it returns as often as every few days; in other instances, in as many weeks; while, in others again, it is not until several months have expired that the Sick Head-ach renews its attack.

"So far as my observation has extended, no age is exempt from

this malady; and it may be induced, by a variety of causes, upon almost every constitution. But the constitution, of all others, the most liable to be afflicted with it, is that which is commonly called *Bilious*."

After this history of the disease, and after some explanatory remarks relative to the term Bilious, Dr. Dwight delivers it as his opinion, that the *Stomach* is the seat of the complaint; and he accounts for it in the following manner.

He supposes that, in persons possessing what is called a Bilious habit, more Bile is secreted than is necesssary for digestion; that it becomes acrid in the stomach, and a chemical process takes place in that Organ, in consequence of which the acrid bile subsides, while another portion of the gastric fluids rises to the top in an acid state; that this acidity counteracts digestion, while the acrid bile stimulates the pylorus into a morbid constriction, which prevents the descent of the aliment, and occasions the eructations observed in the commencement of fits of Sick Head-ach. This process, Dr. Dwight supposes, gradually proceeds for some time, till the accumulation of acrid bile in the stomach (particularly favoured by the long interval between the supper and breakfast), becomes so great as to oppress it by its weight, and irritate it by its acridity, to such a degree, that vomiting takes place, the offensive collections are thrown off, and the system restored to its former condition.—The pain of the head, which accompanies this state of the stomach, originates in the connections of the nerves of this organ with the common sensory, and disappears with the ejection of the irritating materials.

The recurrence of the paroxysms of Sick Head-ach, Dr. Dwight thinks, may "be accelerated by a variety of causes—such as stoppage of perspiration; by taking cold; by fatigue, especially in the sunshine; by excess in eating and drinking; by want of usual rest; by eating of peculiar kinds of aliment, which are more offensive than others, especially by using high seasoning, and by drinking ales and beers before they are thoroughly fermented, as well as after they have passed the first state of fermentation. Indeed, almost any error in the non-naturals will produce this malady in *regular* habits." Temperance, therefore, infers the author, is indispensable to the success of any method of cure. It is accordingly enjoined with emphasis; and the most effectual medical aid then becomes the subject of investigation.

In discoursing of the method of cure, Dr. Dwight maintains, that "*vegetable acids*, in a supereminent degree, correct the *(morbid)* acid of the stomach." Mineral acids, he admits, possess a share of this property, but in an inferior degree.

The next object of inquiry is, what vegetable acid is preferable to all other? and in what form? In answer to this, Dr. Dwight

declares, that ample experience has established the superiority of CYDER over every other; and he points out a remedy and mode of cure equally remarkable for simplicity and efficacy. For this purpose, "Cyder must be well gone through the first fermentative process, and no farther. It ought to be free from all taste of the cask, and all other impurities. A quantity of it, from half a gill to a half a pint, should be drunk on an empty stomach, in the morning.

"It is yet questionable with me," continues Dr. Dwight, "though I have taken considerable pains to ascertain it, how long before breakfast the draught ought to be taken. At present, however, it is my opinion, that from five to fifteen minutes before breakfast is the most suitable time."

The efficacy of this remedy, thus taken, Dr. Dwight accounts for, by supposing that it has a more free access, at this hour, to the cause of the disease (now particularly accumulated in the stomach), than at any other, by reason of the absence of food; and, of course, exerts its correcting powers more efficaciously upon it—while food, being soon taken, prevents any disagreeable effects on the head or spirits, which the Cyder otherwise might produce. He, however, lays no great stress on this explanation; but only remarks, that if it be admitted, it shews the reason why it is necessary to persist in the use of this remedy, from day to day, for a long time, which he maintains to be the fact.

In reply to some objections which have been urged against the use of Cyder at the hour and under the circumstances proposed, Dr. Dwight affirms that he has never known it produce a Head-ach, or even drowsiness; that, on the contrary, "it gives a pleasant relish to the food, warms the stomach, imparts a cheerful energy to the spirits, and preserves the habit of body free and regular;" and that all these pleasant effects have been produced in persons who disrelished Cyder, till they had been prevailed upon to use it in this way, for this purpose. The danger of acquiring the habit of tippling from this practice, Dr. Dwight treats as visionary.

The efficacy of Cyder in the cure of the Sick Head-ach, leads Dr. Dwight to the mention of its success in the cure, or rather prevention, of another disease, which he supposes to depend on the same cause—the *Bilious Colic*. That the Sick Head-ach and this species of Colic depend on the same cause, differently applied, he infers—1. From their affecting persons of the same temperament—the Bilious; 2. From their both observing similar periodical returns; 3. From the circumstance of persons who, in the course of their lives, have been subject to both complaints for years, having uniformly experienced an exemption from one during the reign of the other, alternately; and, 4. From the efficacy

of Cyder in the cure of Colic, as well as Head-ach. "The evidence of its efficacy," continues Dr. Dwight, "is this: The Cyder has been drunk by persons, for months together, with entire relief from the Colic, who, before they began with the remedy, were subject to paroxysms of it every few weeks. After several months had expired, the Cyder was laid aside, and the Colic returned with as great frequency and severity as before. The remedy was resumed, and the Colic again disappeared."

In resuming the consideration of the cure of Sick Head-ach more particularly, Dr. Dwight observes—"It will be readily understood, that I would not, in all cases, rely upon this remedy alone. There are instances where the constitution is worn down by the frequency and excessive severity of the paroxysms, where the stomach is much debilitated, and the whole system greatly enervated. In these cases, it is obvious that the whole tonic plan of cure must be advantageous, when conjoined with the constant use of Cyder. But without this, though the tonic treatment may be productive of some partial benefit, it will rarely afford permanent relief. So the Cyder, though it should operate as a corrector, will not restore the tone which the stomach has lost. This will be done by means of Bark, Steel, Cold Bathing, and Exercise on Horseback, at the same time that care is taken to avoid all meats, seasonings, oils, and gravies, and other errors in the non-naturals, which experience alone teaches us are noxious to the stomach; and which frequently hasten the return of this malady—a malady which, after the longest intervals, always recurs too soon.

"Some persons," Dr. Dwight continues, "when trying the use of Cyder, may be discouraged from making a thorough experiment, if they are not previously warned of the manner in which the Sick Head-ach generally subsides. I have rarely known entire relief *immediately* take place on using the remedy. The more usual progress has been this: The patient experiences a return of several paroxysms; but they are generally after longer intervals, and each succeeding one is commonly less severe than the one immediately preceding it. Care ought to be taken to warn patients of this fact, lest, while the remedy is performing a cure in the usual way, they should grow discouraged on finding the disease return, and, by relinquishing the use of the remedy too soon, should fail of finding that relief from it which a longer use would certainly afford."

In respect to the best season for commencing the trial of the remedy, the author thinks that it should be begun "immediately after the stomach has been evacuated of its contents. With this view," adds he, "I sometimes premise an Emetic, that I may have every advantage from it which the case will admit of. And when I begin with an empty stomach, and pursue the remedy

steadily, in the manner which I have now pointed out, I have, I may say invariably, had the satisfaction of seeing the patients, in a few weeks, entirely relieved from one of the severest natural evils, during its continuance, which ever falls to the lot of mankind."

IN a letter received from Dr. Dwight, by one of the Editors, since the Dissertation was written, he observes, that he has met with an additional case, confirmative of his opinion, that the Bilious Colic and Sick Head-ach depend on the same cause. This was the case of a woman, who (without any knowledge of his opinions) informed him, that for several years she had been subject to frequent returns of the Sick Head-ach; but without ever experiencing an attack of the Colic, till within the last three years. Since then the attacks of Colic have been numerous, but the Head-ach has wholly disappeared.

ARTICLE VI.

A CASE OF DIFFICULT PARTURITION, SUCCESSFULLY TERMINATED BY BLEEDING.

Communicated in a Letter to Mr. Smith, by Dr. WILLIAM DEWEES, *of Philadelphia.*

IN June, 1796, I was sent for to Mrs. T. who was in labour with her second child. The following account, on my arrival, I received from the midwife. "She had been in labour sixteen hours; the waters had been discharged six; the mouth of the womb was but little opened; and, when in pain, the os externum seemed to close up. Many things had been given her, to force the labour; but the child was still as high as ever. She had not passed her water for twelve hours, and was very costive."

I found her very feverish, complaining of great heat in her abdomen, and violent pain in her head. On examining, *per vaginam*, I found, as the midwife had stated, that the os tincæ was but little dilated, its edges very rigid and hot—as was the whole tract of the vagina; the rectum much distended by hardened fæces, and the bladder considerably distended by urine. The head of the child was still above the brim of the superior strait; but I could not exactly determine its situation with respect to the pelvis, as the os uteri was not sufficiently dilated for this purpose.

I immediately bled her twelve or fourteen ounces, and ordered an injection, which procured her two stools, and a discharge of her urine.—I again examined her, and found the mouth of the uterus more dilated (it being now opened to about the size of half a crown), which enabled me to determine the precise situation of the head. It was a perfectly natural presentation, and the vertex had now descended lower into the pelvis. The pains were very powerful. The head at length cleared the superior strait, and the vertex was about to turn under the arch of the pubes, but completely enveloped in the uterus.—During the pain, the perinæum was much distended; and the os externum, instead of yielding to the impulsive force of the uterus, rather closed, so that two fingers could not be retained: a seam or cicatrix, from her having the perinæum lacerated in her first labour,* formed a kind of

* The laceration ran, from the inferior termination of the left labium, to about the termination of the sacrum. I judged of the extent of the injury by the cicatrix, which could be easily traced to this place. And, indeed, in

barrier, and the head, in consequence, was thrown to the right side of the inferior strait, where the parts were so excessively stretched, that I feared each pain would make the head burst through them, in spite of every exertion to the contrary.

From the oblique situation of the head, with respect to the direction of the vagina, the os externum, instead of answering to the axis of the inferior strait, mounted directly to the pubes; and, consequently, the right side particularly of the vagina, perinæum, and rectum, had to support the major part of the force exerted by the uterus and its auxilliary powers. In order to counteract their influence, I supported the external parts with my hands, and made, during the pain, a strong pressure against the head, and directed the woman to suspend her voluntary powers as much as possible. Six hours were spent in this way, without advantage; the os uteri still rigid, hot, and but partially dilated; the os externum still not disposed to yield; and the cicatrix as firm as ever.

The head, notwithstanding my efforts to prevent it, gradually advanced: so that the vertex, covered by a portion of the uterus, had partly emerged from under the pubes. At this period it was extremely difficult to touch the mouth of the uterus, as it had receded towards the sacrum in proportion as the vertex had descended. The soft parts were very hot and dry. I began to be very much alarmed for the fate of my patient. What to do I did not well know. I was ten miles from the city, and no one near me on whose judgment I could rely. In this dilemma I had nearly resolved on dividing the parts, thinking this preferable to letting the head force itself through, which I began to consider as inevitable, when, fortunately, Dr. Physick's case of luxated humerus occurred to my recollection, and determined me to try the effects of bleeding *ad deliquium animi*. I represented to the patient's friends the danger of her case; the possible result of the bleeding; and the inevitable one if it did not succeed. They agreed to the trial. I had her placed erect, while the midwife strongly supported the perinæum, &c. and opening a vein, let it bleed until she fainted.* She was then again placed on her side.

On examining her now, every thing appeared better; the external parts were perfectly soft and yielding, and the os uteri pretty fully dilated: but no pains succeeded. I waited, in this way, half an hour—(the patient continuing very faint)—and no pains

conversing with the gentleman who then delivered her, afterwards, he confirmed my supposition.—It was a long time in healing; and her health suffered much from the excessive and long discharge. But this she recovered; and, when I saw her, she appeared in robust health.—She was about twenty two years of age; of short stature, and rigid fibre.

* The quantity of blood drawn was upwards of two quarts.

coming on, and the parts being now in a proper situation for delivery, I introduced the forceps, and extracted a living, healthy child. The parts very readily yielded without laceration; the woman had a rapid recovery; and the child is still living and well.

Since this case, I have had two others similar to it; both of which were terminated in the same way, except the use of the forceps. These cases, I conceive, very properly suggest the following cautions. 1. Not to wait too long, in cases of this kind, for nature to relax the parts; and, 2. Never to divide the uterus, &c. without having first tried blood-letting.

ARTICLE VII.

On the Use of the Radix Seneka, (Polygala Seneka Linn.) *in the Cure of Croup*—(Cynanche Trachealis Cullen.) *with additional Remarks on the Treatment of this Disease. In a Letter from Dr.* JOHN ARCHER, *of Harford County, Maryland, to* BENJAMIN SMITH BARTON, *M. D. Professor of Materia Medica, Botany, and Natural History in the University of Pennsylvania, &c. &c. Communicated by Dr.* BARTON *to the Editors of the* Medical Repository.

A Particular description of this disease is unnecessary, as it has been well described by several medical authors. I would only remark, that it is a disease incident to the younger part of our species; that I believe it to be a topical disease, confined to the trachea arteria, and in its advanced stage to the several ramifications thereof; that it is produced by a membrane or slough, formed of inspissated mucus, that adheres to the trachea while the more liquid parts are carried off by the air in expiration; that the first formation is near the glottis, at the beginning of the trachea; and that it gradually extends down the trachea, even to its ramifications, until breathing is materially injured, and finally suspended. I have also thought that this membrane produces irritation, from its occasioning an unaccustomed sensation in the trachea, causing spasmodic affections, so as to bring on a more difficult breathing at one time than at another.

The cure, in my opinion, consists in the separation or solution of the membrane or slough that is formed in the trachea arteria. For this purpose I have, in a great many instances, found a decoction of the *seneka* the most powerful medicine in the cure of this disease; and I am happy to tell you that I believe it may be depended on. I make a strong decoction of the root, in the following manner, viz.

℞ Rad. Senek. in pulv. crass. ʒ ss—coque in
Aq. fontan. ʒ viii. ad ʒ iv.

Of this I give a tea-spoonful every half hour, or hour, as the urgency of the symptoms may require—and at intervals a few drops, to keep up the stimulus—until it either acts as an emetic or cathartic. I then repeat it, in smaller quantities, so as to preserve the stimulus of the seneka constantly in the mouth and throat.

The stimulus of the seneka, in the mouth and throat, is very diffusive. Its effects extend to the upper part of the trachea; and, if the formation of the membrane has recently commenced, tend to its solution. But, if the membrane is formed, and its texture has become more firm and adhesive, the seneka penetrates to the trachea, and occasions an increased secretion, which being more liquid, and less adhesive, than the membrane, disposes it to be more easily separated and broken, so that it may be detached and discharged by the efforts of coughing, or by vomiting, when the seneka acts as an emetic. When this takes place, a cure is reasonably to be expected. And this appears to me to be the operation of the seneka, in the cure of this disease.

To be more particular. The method in which I proceed is according to the state of the disease when I am called. If it is a recent attack, I give a tea-spoonful every half hour, or hour, and a few drops at intervals, so as to keep up a constant stimulus—and in this way I have removed the complaint; but if more advanced, and the breathing more difficult, with a peculiar harsh or shrill sound, like air forcibly drawn through a small aperture, attended with a retraction of the upper part of the abdomen under the cartilages of the ribs, I then give calomel freely and frequently, and rub mercurial ointment on the throat and adjacent parts, so as to affect the glands of the throat and mouth as quick as possible. This I do that the mercury may co-operate with the action or stimulus of the seneka, and thereby hasten the separation of the membranous substance formed in the trachea.

I do not conceive that the seneka acts altogether from its emetic, or expectorant, or diaphoretic powers, otherwise other emetics and diaphoretics would cure the disease,—but chiefly from its stimulant effects, and the extension of that stimulus into the trachea.

In the above method I have succeeded in the cure of the croup even beyond my most sanguine expectations.

This last fall I have had more cases of the croup than I have ever known in our part of the country. In the majority of these cases, the decoct. senek. has succeeded without the mercury; and, probably, would have in all, had I thought it prudent to risk the event.

Before I close these observations, I would just mention that Dr. Underwood, in his work on the Diseases of Children, if I forget not, recommends gum. asafœtid. as a very powerful medicine in the cure of this disease—as an antispasmodic. But I conceive that its beneficial effects must proceed from the stimulating powers of the medicine, and the extension of the stimulus into the mouth, throat, and even the trachea, and not to its antispasmodic qualities. Indeed, it is my belief that there are several other medi-

cines that would be equally powerful with the seneka, in the cure of croup: such are the mezereon, pariera brava—and a solution of corrosive sublimate, a drop at a time, till it became emetic. But as the seneka has succeeded with me, to the utmost of my wishes, I have rested satisfied.

March 17, 1798.

ARTICLE VIII.

Two Cases of the Effects of the DATURA STRAMONIUM (Thorn Apple) *on the Human Body; with a few Observations and Remarks. By* BENJAMIN DE WITT, *M. D. Physician in the City of Albany, Member of the Society for the Promotion of Agriculture, Arts, and Manufactures of the State of New-York; Corresponding and Honorary Member of the Chemical and Medical Societies of Philadelphia, &c.*

THE datura stramonium (of Linnæus), like many other plants, has received a variety of different names in different places. In the southern states it is commonly called James-Town weed, because a number of sailors were once violently diseased by ignorantly eating the boiled plant at James-Town in Virginia. It is called French chesnut in New-Jersey, probably from the resemblance which its pod bears to that of a chesnut. It is sometimes vulgarly called stink-weed, from the disagreeable odour which it emits. But it is most generally known in this State by the name of thorn-apple. As this plant grows in abundance in different parts of the United States; as it appears to possess extremely active medicinal powers; and as we are yet but imperfectly acquainted with its operation on the human body, it is presumed the following cases, which, perhaps, may tend to throw some light upon the subject, will not be uninteresting to the medical philosopher.

On the 23d of July, 1797, at eleven o'clock P. M. I was called, in great haste, to visit a child of Mr. S——, aged about two years, suddenly attacked, and said to be dangerously ill. When I arrived, I found her apparently in the greatest agony, with a high fever, a burning heat and redness of the skin, attended with an itching eruption over her whole face and trunk of the body; but her feet and legs were paler and cooler than natural: her countenance appeared suffused and bloated: the pupils of the eyes were greatly dilated: the tongue furred and dry. Pulse weak and so frequent as hardly to be counted. She had an incessant hickup, and frequent ineffectual retchings to vomit. Sometimes she would appear for a moment to be relieved from her anxiety, and sit silent with her eyes fixed on the ground, as if absorbed in contemplation; whilst her hands were employed in picking at her clothes, or any thing that happened to be before her, similar to those in the last stage of some fevers. Then again, she would start involuntarily, quick as if a shock of electricity had passed through her body, with an air of affright, and a loud shriek, her

limbs wreathed with convulsive motions, and her countenance and body distorted in every direction; apparently affected with great pain and anxiety. At other times, in her intervals of ease, she would sing, and sometimes laugh; but could not be made to utter a word: neither did she appear to take notice of any thing that was said to her. In short, the functions of her mind appeared to be entirely deranged. These paroxisms occurred at irregular intervals of five or ten minutes, and continued about the same period. She manifested a great aversion to fluids of every kind. When a cup of water was brought to her lips, she would instantly start from it, and sometimes relapse into her paroxism; so great was her aversion that it was with the utmost difficulty a tea-spoonful of any fluid could be forced down her throat. I immediately suspected the cause of these violent and extraordinary symptoms, knowing that the stramonium grew in the vicinity of the house. Upon particular inquiry I found that she had been in the garden that afternoon, and some of her playmates had observed her to take some seeds into her mouth; which, from a specimen brought to me, proved to be the thorn-apple. This dispelled every doubt from my mind with respect to the cause and nature of her disorder. I exhibited an emetic, composed of a solution of three grains of tart. antimon. in divided portions, at short intervals, judging that a less powerful one would be quite ineffectual to produce full vomiting while she laboured under the violent operation of stramonium. When it operated she brought up a table-spoonful, or more, of the unripe seeds, and diffused the rank smell of that plant over the whole house. After this the child appeared to be better and easier; her pulse became somewhat stronger and slower, and her skin a little cooler.

24th. At day-break I found her in a stupor, from which she could with great difficulty be roused, resembling a person in the highest state of intoxication from spirituous liquors. She had frequent startings and twitchings of her limbs; her pulse was fuller, stronger, and slower than last evening; skin a little cooler; feet warmer; eruption stationary. Lest all the seeds should not have been discharged from her stomach, I ordered a dose of ol. ricin. to be administered immediately. Towards evening the oil had operated; she had somewhat recovered; stupor diminished; pupils of the eyes not quite so much dilated; eruption not so red; she looked sullen and fretful.

25th. Slept well last night; has recovered rapidly, but much debilitated; staggers a little when she walks; skin nearly of its natural colour, but rough and dry; pupils of the eyes contracted to nearly their natural dimensions; eye-lids swelled, and face rather bloated. At twelve o'clock was attacked with a high fever, a slight return of the eruption, and much disposed to sleep. She

now became thirsty and inclined to drink—directed to use lemonade. The pupils of her eyes were now contracted more than natural. Ordered a repetition of the ol. ricin.

26th. Fever continues; pulse preternaturally tense. Suspecting that some of the seeds might still remain in the intestinal canal, I administered a more powerful cathartic.

27th. Purgative had operated well; brought away a large quantity of greenish feces; no fever; pulse natural.

28th. Observed a great many vesications upon her skin, filled with a pellucid fluid; they were extremely numerous and very small, many of them not larger than a pin's head, covering her whole face and trunk of her body. Ordered a continuation of the laxatives, and the lemon-juice for common drink.

29th. She recovered strength fast; plays about the house; appetite increases; vesications drying up; dismissed.

Another case of the effects of the datura stramonium occurred in my practice on the 18th of November, 1797. A young married woman had taken a decoction of more than a table-spoonful of the dryed seeds, which had been prescribed to her by an ignorant person, as a cure for some trifling complaint. Shortly after she was seized with a delirium, her tongue furred, her cheeks flushed, skin warm, and her pulse full and tense. I immediately administered six grains of tart. antimon. in divided portions. Three hours afterwards I visited her again. The emetic had operated but little. She was now in a furious mania, requiring several persons to hold her. She passed large quantities of urine involuntarily as she wandered over the floor. Pulse quick and tense: directed venæsection to ℥ xv. and administered a brisk cathartic. In two or three days she entirely recovered, without the least recollection of any thing that had happened during her illness.

The observations and remarks which naturally occur to the mind upon considering these cases, and comparing them with others of a similar nature, are,

1st. The great pain and anxiety which the seeds of the stramonium seemed to produce. Though in the first case the patient was so young as not to be able to describe its own sensations, therefore we have not that positive certainty of this being actually the case, as might have been obtained from an adult: still I have no doubt in my mind respecting it: indeed, every one who was present could not help drawing this conclusion from her countenance and actions. Her depressed eye-brows and distorted mouth; her restless condition, and the violent shrieks which she uttered, rendered it abundantly manifest. This I believe is rather an uncommon effect of the stramonium, or has not been taken notice of in the experiments and observations which I have seen upon that subject. I should be disposed to ascribe it entirely to the

large quantity which was taken, and to the suddenness of its operation, from the seeds being as yet soft and white, not having come to maturity. In the case related by Dr. Rush, in the Transactions of the Philosophical Society, no circumstances are mentioned which indicated a painful affection. On the contrary, the patient was said to be first in a *delirium*, and afterwards in a *stupor*. In that case the effects of the seeds were evidently slowly induced, as the seeds were "hard as horn, and of the last year's growth," and some of them were vomited up whole after several days. In the experiments which were made upon this plant by Dr. Samuel Cooper, in the Pennsylvania Hospital, and published in his Inaugural Thesis, no mention is made, that I recollect, of their having this effect, except a slight head-ache; but the doses which he exhibited were comparatively very small. If we find, however, that in some instances it produces inflammation and gangrene in the stomach and intestines, we can have no hesitation to believe that it should previously induce acute pain in those parts.

2dly. The convulsive motions. These, perhaps, would be a constant effect of the stramonium, taken in certain quantities, as well as some other narcotic substances; but from the comparatively few observations which we have as yet relative to the operation of this plant, appear to have occurred very seldom. The only instance which I now recollect that bears much resemblance to the present case, is that of the young rat, to the surface of whose body Dr. Cooper applied a strong decoction of the leaves. Like those the convulsive motions were alternate, sudden, involuntary, and violent. The startings in sleep, which he mentions as occurring in some of his experiments, may have been similar, but much less violent.

3dly. The apparent dread or aversion to water or fluids of any kind, which occurred in one of these cases, is another circumstance worthy of notice. A similar instance of two children who had eaten the seeds, is related by Dr. Lobstien, in the Medical Transactions.

4thly. The vesications on the child's skin after the violent symptoms subsided, are not taken notice of, that I recollect, by any one who has heretofore written upon the subject. This, perhaps, is an effect somewhat similar to the itching and redness of the skin, which is sometimes produced by opium, cicuta, &c. but much more violent. In the instance before us, I am disposed to ascribe it principally to the extraordinary quantity of the dose, producing so violent an action in the vessels of the skin, as to cause an effusion of serum under the cuticle, similar to what happens in erysipelas, and the external application of cantharides.

5thly. The large and involuntary discharge of urine is another effect which deserves attention. I recollect to have read, some-

where, of a similar case. If this should be a constant and uniform effect, the stramonium may, perhaps, in some future time, be classed with our most powerful diuretics.

From a review of the cases before us we may farther remark the extremely active stimulating powers of this plant, with respect to the human body. Its operation would seem almost to have equalled the combined force of plague, small-pox, hydrophobia, and convulsions. Like the contagion of the plague and yellow fever, it acted with such energy and violence, as at once to prostrate the powers of the arterial system. This was manifest from the weakness and quickness of the pulse, and the coldness of the extremities. Like the causes of the small-pox, measles, and other eruptive disorders, it produced an eruption, effusion, and suppuration on the skin: like the canine virus, it produced something very similar to hydrophobia; and, like many of the most powerful stimulants, it excited the muscles to irregular convulsions. In the stomach and intestines, the more immediate seat of its application, by its violent stimulus, it produced a state of great indirect debility, and, consequently, torpor and inactivity. In the brain and nervous system, it excited mania and convulsions; and in the arterial system, fever of the highest grade. In short, it exerted its powers over the whole body, scarcely leaving any part unaffected; and must inevitably have brought about the dissolution of life with irresistable impetuosity, had it not been instantly expelled from the body.

ARTICLE IX.

Medical Observations on the Virtues and Properties of the Seeds of the DATURA STRAMONIUM.

By Dr. ALEXANDER KING, *of Suffield, Connecticut.*

[The Editors have taken the liberty of omitting Dr. King's botanical deſcription of this well-known plant; and in arranging the two Eſſays of Dr. De Witt and this Gentleman, have choſen to place this ſecond, as exhibiting the *curative*, as that diſplays the *noxious* efficacy of this active vegetable.]

THE ſeeds of this vegetable are, ſo far at leaſt as I have made observations upon it, the only parts uſeful in the Materia Medica, as they contain all the virtues of the plant, refined and prepared by the hand of nature.

These ſeeds, by expreſſion, yielded a mucilaginous oil, which is cooling, anodyne and repellent, when externally applied. The virtues are pretty readily obtained by decoction, in an aqueous menſtruum. Half a drachm of the bruiſed ſeeds, boiled in four ounces of water, until half the quantity is evaporated, is a ſuitable quantity for a grown perſon in twenty-four hours, to be taken in divided doſes.

An extract may be obtained by boiling any quantity of the bruiſed ſeeds, in a convenient proportion of water, for the ſpace of four hours; then ſtrain off the liquor by preſſure; evaporate over a gentle fire, without taking off the ſcum, until it has acquired the thickneſs of a ſyrup; then remove the liquor from the fire, and place it in a warm oven, in an earthen glazed veſſel, until the aqueous parts are evaporated, and it becomes of a proper conſiſtence for uſe. The doſe is from half a grain to one grain for an adult.

The operation of this medicine, when taken in ſmall doſes, is moderately diuretic, and impregnates the urine pretty ſenſibly with the ſmell of the ſeeds. It is cooling, anodyne and ſedative. It relaxes the tone of the ſolids, leſſens the contractile force of the arterial ſyſtem, and, conſequently, moderates the violent attrition of the circulating fluids againſt their containing veſſels, lowers the pulſation of the arteries, and renders the pulſe ſlower, more uniform and equable, when excited by violent ſtimuli. If taken in large doſes it produces the following ſymptoms: the firſt ſenſible effect is in the ſight; there appears a preternatural dilatation of the

pupil of the eye; vision is rendered indistinct and confused; objects appear multiplied, diversified, and variously coloured; the patient complains that he does not see clearly; he cannot discern a small object, such for instance as the point of a pin or needle; he sees objects in the room which do not exist, and complains of a numbness of the head, attended with vertigo. It also affects the organs of speech. He faulters in pronunciation; his tongue is rendered paralytic; or, when he attempts to put it out, imitates the motions of a person who tries to do the same in a nervous fever. The whole nervous system is disordered; various parts of the body become paralytic. From the senses it extends its influence to the mental faculties. The imagination is confused and disturbed with fear. Terrifying apprehensions perplex the mind, and impress on the countenance the image of this passion. These symptoms all disappear in the space of twenty-four or forty-eight hours, sooner or later, according to the degree in which they prevailed, without any medical assistance.

What further untoward appearances would be the effects of larger quantities taken into the stomach, I have not observed; but, probably, a total derangement of the intellectual powers, stupidity, and, perhaps, death.*

The medicinal virtues of these seeds will appear from a recital of the following cases, so far as I am acquainted with their efficacy from experience and observation.

CASE I.

A young man of about fourteen, of a tender, delicate habit, was seized with a violent pain in the head, attended with fever, sickness at stomach, and vomiting. I saw him the second day of his illness. His pulse then indicated a considerable degree of inflammation; his eyes appeared red and inflamed, wild and staring, accompanied with some degree of delirium; the pain in the head, and sickness at stomach still continuing very severe. I considered the case as an inflammation of the meninges of the brain, and treated it as such. He was bled plentifully. I directed his head to be shaved, and linen cloths, wet in vinegar, to be applied to his head, and frequently renewed: prescribed for him a cooling cathartic, and ordered his feet and legs to be bathed in warm water, and put him on the use of cooling drinks and medicines.

Visiting him on the third day of his sickness, I found his pulse not so hard as before the first bleeding, but very quick; the purge had wrought, and procured some abatement of sickness at sto-

* I have known an instance of a young lad who, incautiously, ate these seeds, which produced a distorted eye, that remained ever afterwards.

mach, but no mitigation of the other symptoms. Alienation of mind was more apparent: he was constantly picking the bedclothes, or pointing at imaginary objects, which he pretended to see about his bed, and muttering to himself. I repeated the bleeding, prescribed alvine injections, and continued the cooling regimen and medicines.

On the fourth day of his illness I found him no better; his pulse weaker; the delirium had considerably increased, and he was sometimes raving. I then applied an epispastic to the crown of his head, and pursued the plan before prescribed.

On the fifth day I found all the symptoms of phrenzy increased, attended with convulsive spasms and twitching of the nerves. His hands and feet began to feel cold, and his pulse was evidently sinking. He had slept none after the first night of his illness to this time; the pupils of his eyes were dilated to nearly twice their natural dimensions; a dissolution appeared to be fast approaching, and death at no great distance.

The plan I had pursued did not avail my patient, or procure him the least advantage, or produce any mitigation of the threatening symptoms. I determined, therefore, to try the effects of the stramonium, and accordingly prepared the decoction in the manner before recited, and directed the attendant to give him a teaspoonful every half hour.

The next morning found that he had slept about fifty minutes in the course of the preceding night, which was the first appearance of rest since I saw him; his hands and feet were rather warmer, with a small degree of moisture, which before had been quite dry and husky; the delirium still continued, but not so violent and outrageous. I continued the decoction, and directed the nurse to repeat it oftener.

The next morning found the fever and delirium evidently abated; there also appeared a plentiful discharge of urine, strongly impregnated with the smell of the seeds.

On the following day, he appeared perfectly calm and composed, after a quiet night's rest; but complained of a pain in his breast, attended with a cough, and other peripneumonic symptoms. A blister, applied to the part affected, presently removed that complaint, and he soon recovered.

CASE II.

A man of robust constitution, and sanguine habit, about twenty-six years of age, after drinking pretty freely, was seized with a slight paroxysm of the apoplexy, which was followed with a cold fit or fever, attended with a violent pain in the head, and delirium. On the second day I found him delirious, with an inflammation

of the brain, or rather the meninges. I bled him largely, so that he even fainted in a recumbent posture, which was succeeded by another partial paroxysm, similar to the first. I put him on a course of medicine, nearly the same as prescribed in the former case. The next day I found no abatement of the symptoms: he had slept none for two nights past, and was quite outrageous. I then prescribed for him a decoction of the seeds of the datura stramonium, and directed the nurse to give him a tea-spoonful every quarter of an hour. I found, on visiting him the next morning, that soon after taking the decoction, he became calm and composed, and went to sleep. I continued the same medicine through the course of the fever, which lasted about seven days, except one day, in which I purposely omited the use of it, in order fully to satisfy myself as to the operation of the medicine. On that day the delirium returned, and he slept none the night following. The next morning I had recourse to the decoction as usual, and it produced the same salutary effects as before.

In this case I had a fair opportunity to observe the action of the medicine in an early stage of the disease, which was cooling, anodyne and sedative.

I have used it in two other cases of the same disorder with equal success, which it will be needless particularly to relate.

I have also prescribed the same decoction, in one instance, without any advantage; but in that case a general torpor and insensibility had taken place before I saw the patient, and he died the next day.

This medicine has been recommended as a remedy for epileptic fits; in which disorder I have sometimes prescribed it, but I cannot say with any great success. I have found steel a much more efficacious medicine in epilepsy.

According to my observation, a decoction appears to be the most eligible form of exhibiting this medicine, as the physician (and none but such ought to use it) can determine with more precision the proper dose, and will be able to regulate its effects with a greater degree of exactness than in any other form.

ARTICLE X.

OUTLINES OF MEDICAL GEOGRAPHY:

Being an Inquiry how far Calcareous Soils and Strata counteract the septic Exhalations which occasion Distempers of a febrile or pestilential Type. In a Letter from Dr. MITCHILL, *F. R. S. E. Member of the Legislative Assembly, and Secretary of the Agricultural Society of the State of New-York, Professor of Chemistry in Columbia College, Fellow of the Societies of Philadelphia, Boston, &c. &c. to* JAMES HAWORTH, *M. D. and Radcliffian Travelling Physician from the University of Oxford, dated November* 4, 1797.

IF there is any solidity in the observation made in my letter to Dr. Beddoes of September 15, 1797, concerning the comparative mildness or rarity of pestilential and febrile distempers in countries underlaid with extensive strata of superficial *lime-stone*, as happens in some parts of the United States, then England ought to exhibit something of the same kind, in the counties where *chalk* is very prevalent. I now set myself down to recollect what I remarked about calcareous earth in travelling from Dover to London, and during a walk I once took from London to Oxford and its environs, Woodstock, Blenheim, and back again.

The chalk cliffs in the neighbourhood of Dover, are talked of by all persons who navigate the Channel up and down, or who barely pass from any of the opposite ports of France to this part of England. It has not been so generally noticed that the land from Folkstone, in Kent, or thereabout, along by South-Foreland, and almost to Deal, together with good part of the Isle of Thanet, including both Ramsgate and Margate, has a chalky bottom. Indeed, with very little interruption, the calcareous material prevails to a very considerable extent on both sides of the road from Dover to Canterbury, and thence to Rochester. In short, I may say it extends westward quite to the county of Surry, and passes into it by a tract almost as broad as the distance from Deptford to Westerham. This is the most healthy part of the country, as may appear by comparing it with the unwholesomeness of Oxney Isle, Romney Marsh, and the Isle of Sheppey, where not chalk, but siliceous sand, flint, clay and loam constitute the principal part of the soil. (See the map prefixed to Mr. BOYS' General View of the Agriculture of the County of Kent. London. 1796.)

The chalk continues through part of Surry, Berkshire, much of Oxfordshire, quite into Gloucestershire, and prevails extensively in Buckinghamshire, Middlesex, and somewhat in Essex. Oxfordshire, though situated so far inland, is famous in many places for its petrifactions and incrustations of calcareous earth. Through this cretaceous land run the *Isis*, the *Charwall*, the *Windrush*, the *Evenlade*, the *Thames*, and, according to Dr. PLOT's enumeration, *seventy* other streams of inferior rank, whose collected waters pass through the enumerated chalky tracts to London, and the greater part of the distance thence to the sea.

The latter of these rivers, and some others which fall into it below, are prettily noticed by POPE in his poem of Windsor Forest.—

> ——————" in ancient times we read,
> Old Father Thames advanc'd his reverend head:
> His tresses dropp'd with dews, and o'er the stream
> His shining horns diffus'd a golden gleam:
> Grav'd on his urn appear'd the moon, that guides
> His swelling waters and alternate tides;
> The figur'd streams in waves of silver roll'd,
> And on their banks *Augusta* rose in gold;
> Around his throne the sea-born brothers stood,
> Who swell with tributary urns his flood;
> First the famed authors of his ancient name,
> The winding *Isis* and the fruitful *Thame;*
> The *Kennet* swift, for silver eels renown'd;
> The *Loddon* slow, with verdant alders crown'd;
> *Cole*, whose dark streams his flowery islands lave;
> And *chalkey Wey*, that rolls a milky wave;
> The blue transparent *Vandalis* appears,
> And gulphy *Lee* his sedgy tresses rears;
> The sullen *Mole* that hides his diving flood,
> And silent *Darent*, stain'd with Danish blood."

The inferences to be drawn from these geographical facts are two. 1st. That an extensive body of chalk, or calcareous earth, of very considerable breadth, tinctures, with its peculiar qualities, the soil of England from the German Ocean westward, to the hills which separate the waters of the Severn from those of the Thames in Gloucestershire. 2dly. That the greater part or all of the streams falling into the Thames, run through a country charged with calcareous earth, and, consequently, must be considerably impregnated with that material.

With regard to the first point, if the *septic gas*, or *effluvium*, is, as experiments lead us to believe, of an acid nature, in that

case it ought not to be very abundant or long prevalent as a cause of epidemic, malignant, and pestilential distempers, where the land is composed, in a good proportion, of calcareous earth; or, if in any place, or at any time, it should happen that febrile disorders of greater or less malignity or inveteracy break out, this ought to happen in consequence of too much acid present for the chalk or lime to neutralize. On looking over the first authority that comes in my way, MARTIN's Natural History of England (edition published in 1759), I find Surrey denominated generally "a pleasant country;" Middlesex commended for its "exceedingly healthful air;" Berkshire called "one of the most pleasant counties in England;" Buckinghamshire said to possess an air generally good, especially on the Chiltern Hills; and though the vale is dirty, "not so unhealthy as many other low lands in England, THE SOIL BEING MARLE OR CHALK;" and the eastern part of Gloucestershire, where the Evenlade and Windrush rivers arise, though less fertile than the western part of the county along the Severn, and more exposed to wind and cold, "makes amends by its healthfulness."

The healthfulness of Oxfordshire is almost proverbial, and the judicious choice of King ALFRED has long been commended for pitching upon so wholesome a spot as that where the beautiful city of Oxford stands, as a seat for the muses. This has been considered as very strikingly manifested by the two following circumstances. 1st. An observation of long standing, that although the small-pox is as frequent there as any where else, the effects of it are seldom fatal; and, 2d. That when the pestilence, in 1665, was spread in a manner over the whole kingdom, though the court, both houses of parliament, and the terms, were held in the city of Oxford, yet the plague, notwithstanding, was never there at all. (1 Martin's, &c. p. 368.)

On the other hand; where, along the fenny hundreds of Essex, the joint operation of the current of the Thames, and the tides of the ocean, have brought together great bodies of sand and clay, that had been diffused through the water, and been deposited by it, together with all such remains of animal and vegetable matter as constitute the deep mould of those tracts, the country abounds thereabout with septic exhalations, which are very injurious to the health of the inhabitants, where the neutralizing power of calcareous earth or chalk is wanting: and, as far as I can judge, a deficiency of the same material enters deeply into the explanation of the unhealthiness of the fens of Lincolnshire, and the adjoining hundreds of Fleg and Mershland, in Norfolk.

It must be observed, however, although chalky and calcareous soils are thus destructive of that kind of air or vapour which produces agues, fevers, &c. that it does not follow, by the rule of

contraries, that all sandy, loamy, gravelly, and clayey soils must be unhealthy. This may, however, be remarked, that in the United States of America, the most sickly parts are the tracts along the Atlantic, where the land consists, in pretty much the whole range, from New-York to Florida, of silicious sand and clay, variously mingled, and tempered with more or less of mould, without any considerable admixture of calcareous earth; and this, when it occurs, consisting principally of concretions of marine shells, dug up in some parts of Virginia and the other southern States. As to our cities, the site of New-York is a sandy loam, or gravel, except that part where the plague has usually prevailed hitherto, which is built upon salt meadow, miry swamp, and rotten trash. Philadelphia stands partly upon a sandy, and partly upon a stiff loamy or brick-earth, very impermeable to water, and destitute of a sufficient proportion of calcareous earth to keep down and attach pestilential fluids. Though, of both these cities, it may be remarked, with truth, that though they were built upon a bottom of *lime*, or *chalk itself*, there are local causes enough to engender the worst forms of distempers, as happened at the famous assizes in Oxford, where the filth, accumulated around the wretched criminals in prison, generated pestilential matter enough to poison a considerable number of the court and attendants.

As far as I can comprehend the subject, the general conclusion is this: Countries abounding with calcareous earth are mostly free from the ravages of wide-spreading epidemics, by reason of the power that material possesses of neutralizing the acid of putrefaction; though, from particular local causes, pestilence may be manufactured in places thus favourably circumstanced: while those places which are most remarkable for the prevalence of malignant and pestilential diseases of that kind, consist of a soil through which chalk and lime are scantily scattered. England affords abundant proof of the former, the United States of the latter, observation.

To proceed now to the second point: The numerous streams of water whose united body forms the Thames, run principally, it was said, through a tract of country plentifully furnished with chalk. The form in which this calcareous earth is most prevalent is that of carbonate, or in combination with fixed air, and capable, in many places, of being burned to quicklime: though, doubtless, where the septic (nitric) acid exists, it unites with the earthy basis into calcareous nitre. There is, unquestionably, somewhat of a muriate of lime, especially below London bridge, and the whole distance thence through the brackish and salt-water to the ocean. And perhaps there may be, in some places, a combination of the sulphuric acid with the calcareous matter into gypsum. The small quantity of gypsum which exists there, and if much did exist,

the very trifling proportion of it which water is capable of dissolving, leave very little to be said concerning it here. The muriate of lime is there probably in too small proportion to be matter of any moment any where above the flow of the salt-water; and though, as CAMDEN says, the river swells as high as Richmond, which is sixty miles inland, (Britannia. 187.) with the tide, yet the salt reaches not a great distance from Gravesend.

The septite of lime is soluble in water; but as it is also a nutritive ingredient in manures, and easy of resolution into its constituent parts by plants, it is presumable that a large proportion of what is formed of that compound undergoes decomposition on the soil where it is produced. The carbonate of lime, then, or common mild chalk, is the material upon which the streams of water, in the case before us, must principally act.

Water may work upon this mild calcareous earth in two ways: 1. By acting as a menstruum, or jointly with some substance which is a menstruum, and *chemically* dissolving it; and, 2. By *mechanical* attrition, wearing it away, reducing it to fine particles, and while it is diffused and floating through the liquid, carrying it down in its proper form to be mingled and deposited with the various matter of intervale spots, alluvial shores, and secondary islands.

It is hard to determine what quantity of calcareous earth is brought down in these two modes, from the adjacent counties into the bed of the Thames, and hurried along with his stream towards its disemboguement. When all circumstances of showers, rains, freshets, and the unceasing atteration of the streams along their channels, are taken into the account, the quantity would seem to be very considerable. This chalky substance, whether dissolved in the water, or diffused through it, cannot fail to modify and influence it remarkably; in an especial manner contributing to fertilize the low lands in the neighbourhood of the river which it visits or overflows.

Thus the septic and other acids with which the Thames water was charged, are, in a great measure, or perhaps quite, neutralized by the calcareous earth, before it reaches London. The quality of the water there will be, in a good degree, determined then by the materials furnished by that city. The acid of putrefaction and other acids running into it from the sewers, will, under the existing regulations, be neutralized by the refuse alkaline matter of house-keeping, and other consumptive processes; and the potash and soda thrown away in soap, &c. seem to more than counterbalance their opponents, and give a preponderating influence to the alkalies. Hence evidently proceeds the boasted softness of the Thames water for the washing of linen; for enabling the London dyers to strike their bright and lasting colours; for keeping so well at sea as it does; and, probably, enabling it to extract, in a very com-

plete manner, the substance of malt to form their excellent porter. Is not all this confirmed by the fact known to navigators, that the Thames water, after long keeping, deposits, within, a stony sediment on the bottoms of the casks?

So much for the waters of the Thames, and the chalky regions through which they run. The facts are very striking and interesting, but they are not the only ones of the kind.

When I was in France, I once passed up the river Loire, partly by land, and partly by water; but, at Angers, turned off to the left on my rout to Paris. I therefore did not travel through that fine tract of country watered by the Mayenne, the Indre, and Upper Loire, which abounds in the soft calcareous stone, that by bare exposure to the open air, becomes highly charged with septic acid. Nor did I visit Saumur, the center of a district of calcareous earth, in which the acid of putrefaction is so abundant as to require nothing but an addition of pot-ash to turn the calcareous nitre to salt-petre. If the philosophers of France would inquire into the circumstances with a due degree of attention, I am persuaded they would find that the lime-stone, which, by combining with this acid, gives to the soil much of its fertility, prevents, at the same time, the rise of its pernicious vapours into the atmosphere. (FOURCROY's Speech to the Council of Ancients, Med. Repos. No. I.—3 Diction. Univ. de la France, Artic. SAUMUR, p. 64, where the salt-petre refined there is called the best in France.)

From the manner in which Mr. HOUSEMAN expresses himself in the Journal of his late tour through England, there is strong reason to believe that the salubrious air, for which Matlock in Derbyshire is so famous, has a connection with, and is partly dependant upon, the lime-stone-rock, abounding in the valley through which the river Derwent there runs (Monthly Mag. for March, 1797. p. 203.)

But that fertile tract of land, THE CARSE OF GOWRIE, in the county of Perth in Scotland, which is reckoned to possess a climate more mild and favourable to vegetation than any part of that kingdom, affords *direct* evidence of the healthiness consequent upon using lime as a manure. The soil consists chiefly of rich clay, loam, and sharp gravel; and the inhabitants, until the year 1735, used to be subject to the ague. Then one or two of the principal proprietors undertook, by draining, summer-fallowing, and sowing grass-seeds, to improve their estates. Accident led them to a discovery of the efficacy of lime on that soil, from observing the powerful effects of *some old lime rubbish of decayed buildings*, when spread on the corner of a field. The liming their lands then gradually came into use, and has since been generally adopted; the consequence of which is, the AGUE HAS LONG

AGO DISAPPEARED. Here seems to have been a beautiful experiment made upon about ninety-six square miles of country, where the septic steams that formerly gave the people agues, are now attracted by the lime and turned to calcareous nitre, while increased productiveness of the land, and greater wholesomeness of the air, continue to be the happy consequences. (Donaldson's General View, &c. p. 12. and seq.) Some judgment may hence be formed concerning the power of art in changing the face of nature. What a grand reflection, that an inconsiderable quantity of powdered lime strewed over the land, should thus coerce the matter of pestilence, and controul the operations of the atmosphere!

I shall bring this letter toward a close by inserting some facts of the same kind, afforded by Sicily. *Calcareous earth* abounds in the neighbourhood of Palermo, in the form of *lime-stone*, (2 Swinburne's Travels, p. 199.) *stalagmites*, (p. 201.) and *breccia*, (p. 203). On the road thence to Girgenti, it exists in the form of *marine concretions*, *talk*, *gypsum*, (p. 227.) *chalky stones*, (p. 243.) and *rocks*, (p. 256). In the neighbourhood of this place, the ancient Agrigentum, *marine exuviæ*, constitute good part of the lower strata of the hills, (p. 258.) and many of the buildings are constructed of a conglutination of sea-sand and *shells*, (p. 268). On the road from Alicata toward Syracuse, some of the cliffs bordering on the Mediterranean Sea, are composed of a *greenish marle*, full of sulphur and *solid rocks of gypsum*, (p. 284). And on the road to Messina, the traveller meets with lofty broken mountains, composed of marble and various sorts of calcareous stones, (p. 358.) and with high calcareous *cliffs of red and white marble*, (p. 361). To this basis of calcareous earth, which is now covered over, to great extent, by lava and other volcanic productions, that remarkable island owed formerly, and still owes a great share of its wholesomeness and fertility. The manner in which this was effected, seems visible on the *Leontine Plains* and their vicinity. The town of Lentini, though situated on a spot so exceedingly productive of vegetables, is, however, unhealthy during summer and autumn, on account of its nearness to the lake of Biveri, and a great space of country filled with lakes and ponds. The hills which inclose it on the east side, afford great quantities of saltpetre; and people are constantly employed in scraping it off the walls. Do not the vapours of the low grounds which infect the atmosphere there, attach themselves to an alkaline basis as soon as they meet with it, and form the nitre? Is not the formation of the nitre, in such circumstances, a tolerable indication that a prevalent ingredient in the air of that sickly region, is the septic (nitric) acid vapour exhaled from the place of its production, the marshes? – And is not the effluvium which exhales from the head

of the port of Syracuse formed in like manner, by chemical union of the septon (azote) and oxygene of substances undergoing putrefaction there; which, volatilized by the heat of summer, vitiates the air and endangers the lives of the inhabitants? And was it not a miasma of the same nature and composition, which caused that malignant fever, or plague, which destroyed the Carthagenian army encamped in the fens, when they came to rescue this city from the Romans?

But why do I take the tour of Europe to establish the fact of the salubrity of countries consisting of calcareous earth, or underlaid by it? Nearer home, the island of Bermudas and its neighbouring isles, furnish abundant proof of the same thing. The whole cluster consists of calcareous matter, apparently formed of the fragments of marine shells compacted into a porous and friable sort of white stone. This neutralizes the acid of their rain water, and all other acids, so effectually, that a generally pestilential state of the atmosphere is unknown there; and the Somers' islands have become famous for the wholesomeness of their climate, and the longevity of their inhabitants. Yet even there, damaged provisions, excessive use of salt meat and fish, wheaten flour, and meal of maize, both soured by keeping, sometimes excite considerable febrile sickness, which, however, is remarked never to spread by infection; the septic acid evolved from meat and meal being checked by the lime as soon as it is wafted abroad, but being still capable of working its accustomed mischief in many of the places and substances where it is immediately produced.

One paragraph more and I shall conclude. Read the hypothesis of Linnæus (1 Amænitat. Academic.) on the cause of intermittent fevers, and you will find a collection of facts to prove their connection with argillaceous earth, or clayey soil. Of this he was so well satisfied, that he concluded that attenuated particles of clay taken into the body with food and drink, entered the blood, stuck in the extreme branches of the arteries, and brought on, as a true proximate cause, the symptoms of the disease. (Hypothesis nova, § v.) The sensible inquirer will find, in his fourth section, an enumeration of all the parts of Sweden famous for intermittents and strata of argillaceous soil; and the authority of Mr. Sandel, quoted as an eye-witness of the same coincidence of clayey bottoms and intermittent fevers in Pennsylvania. The facts I take to be indubitable. Linnæus has reasoned upon the subject, by considering argillaceous earth alone. I have viewed it in contrast with calcareous earth, that, by embracing a wider range of facts, the operation of the latter, in tempering the former, may be the better comprehended. Whether my theory is better founded than that of the Professor of Upsal, the experienced and candid will judge.

I thank you for your copy of old MAYOW. That this man, who was a London physician, and a fellow of All-Souls-College, his brilliant discoveries, and his book which contains the account of them, should all be forgotten, in his own country as well as abroad, within less than one hundred years, so effectually that FRANKLIN could never have read his explanation of water spouts, nor SCHEELE his detection of dephlogisticated air, nor GIRTANNER his manner of accounting for muscular action, nor any body else, what he has left on respiration and on the condition of the unborn fœtus, and unhatched chick, are among the most singular occurrences in the literary history of the 18th century.

Wishing you a prosperous voyage, and a happy meeting with your friends, and with ALMA MATER, I finish my letter, by assuring you, &c.

SAMUEL L. MITCHILL.

ARTICLE XI.

Second Letter from Dr. PRIESTLEY *to Dr.* MITCHILL, *Professor of Chemistry at New-York.*

DEAR SIR,

I AM very glad that your *Medical Repository* is extended to subjects of general philosophy and chemistry. Had I known this before, I should have taken the liberty to send you an account of some of my late experiments, especially those which have for their object the decision of the question between the phlogistians and the antiphlogistians. I have not yet seen any part of the work, but shall not fail to procure it the first opportunity, and consider the history, which you say it contains, of the controversy between me and my opponents. In the mean time, I beg you would communicate to the publishers the following account of an experiment which I wish Dr. Maclean, and other advocates of the new theory, to consider, and endeavour to explain on their principles. Our common object is the investigation of truth; and surely a question of this nature, purely philosophical, may be discussed in the most amicable manner. The pamphlet in which I replied to Dr. Maclean and Mr. Adet, I presume he will answer in a separate pamphlet; and having waited for it some time, I am now in daily expectation of it.

An argument on which, in my late publication, I laid some stress, is, that when inflammable air is procured by the solution of iron in diluted acid of vitriol, there is no addition of oxygen found in the vessel in which the process is made, which ought to be the case if the inflammable air came from the decomposition of the water; and that *finery cinder*, called, by the antiphlogistians, *black oxyde of iron*, cannot be proved to contain any oxygen at all, though, according to their principles, it constitutes about one-third of its weight. I have, since this, made a similar experiment with *zinc*, which is another metal, by means of which inflammable air is easily procured, and which I think rather more decisive in favour of my hypothesis; which is, that the inflammable air comes from the *metal*, and not from the *water* in which it is dissolved; and, therefore, that metals are compound substances, consisting of phlogiston and peculiar earths, and that water is not decomposed.

On throwing the focus of a burning lens on a quantity of zinc in common air, confined by water, in a glass vessel, the first effect

is the production of *flowers of zinc*, which make a beautiful appearance, by their dispersion within the vessel; and during this part of the process the air is diminished, the pure part of it, no doubt, entering the calx, while the phlogisticated part remains unaffected. After this, the application of the heat being continued, there is an increase of the quantity of air by the production of inflammable air; and instead of flowers of zinc, a *black powder* arises, and adheres to the inside of the vessel, and with care may be collected.

Now, since inflammable air is produced, the antiphlogistians must say, that part of the water over which the experiment was made, was decomposed. But then I ask, where is the oxygen which, according to them, constitutes the far greater part of the water? I cannot find it any where. The *water* is entirely free from acidity, and the air expelled from it afterwards is even less pure than that which it yields before the process. And if I examine the *black powder*, by heating it in confined common air, it becomes a whitish substance, the air is diminished, and rendered in a considerable degree impure; whereas, if it had contained any oxygen, the quantity would have been increased, and it would have been purer than common air; as when *red precipitate*, or *minium*, is treated in the same manner. It is evident, therefore, that it contained no oxygen, but a quantity of phlogiston, on the expulsion of which, and the imbibing of pure air, it became flowers of zinc.

This experiment is rather more decisive than the similar one with iron, because the black powder to which zinc is reduced can be affected by heat in common air, which finery cinder cannot.

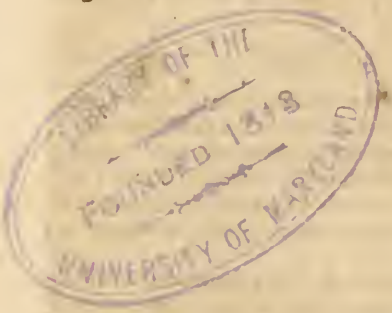
I have been in expectation of hearing from Mr. Berthollet, and the other chemists in France, to whom my first publication on this subject was addressed; but as there is now no communication between this country and that, I shall be glad to proceed in the discussion of the question with Dr. Maclean and other chemists on this continent. I shall attend with candour to any thing that they shall suggest, and freely acknowledge any mistakes or oversights into which I may have been betrayed: but I hope it will not be taken for granted, that where the results of experiments are differently reported by the French chemists and myself, they are always in the right. An impartial judge will see with his own eyes, and if he have not the means of doing this, he should not decide at all.

I beg to hear from you oftener,
And am, with great respect, dear Sir,
Yours sincerely,

J. PRIESTLEY.

Northumberland, June 14, 1798.

P. S. Please to return my compliments to Chancellor Livingston. I shall be glad to hear the result of his experiments on gypsum. I am watering some clover with a solution of gypsum. When I see the effect, compared with the common method of using it, I will inform you. I suspect that it acts as a *stimulus* only. I once thought it might act by attracting moisture. If so, pounded glass, &c. may be useful. I shall try that, and other things.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ARTICLE XII.

ANSWER to the TWO LETTERS *from Dr.* PRIESTLEY.

To JOSEPH PRIESTLEY, *LL.D. F.R.S. &c. &c.*

DEAR SIR, *New-York, June* 20, 1798.

FINDING, by your letter from Northumberland, of January 18, 1798, (see Repository, vol. i. No. 4. p. 521.) that my attempt to accommodate the disputes among the chemists, concerning phlogiston, had not, in your opinion, been successful, I once more beg your indulgence a few moments, while I state some additional reasons to shew that it will answer as fully as I promised myself.

You object to the conclusiveness of the experiments with the eolypyle, which I adduced to shew that red-hot charcoal could decompose boiling water; the oxygene of the water uniting with a portion of the carbone into carbonic acid gas, and its phlogiston (hydrogene), with a portion of the oxygene of the atmosphere, into the oxyd of phlogiston (water). Your objection is grounded upon the extinguishment of ignited charcoal by steam, and upon the failure of Mr. Wilkinson to increase the flame of his furnaces, by adding the eolypyle to the common bellows. But these do not appear to me in the light of objections. In order that heated water should be decomposed in the experiment with the eolypyle, it is necessary that the charcoal be exceedingly hot; and this heat must be produced by decomposition of the fuel, of oxygenous gas, or some other source, and not be afforded by the water. On the contrary, as water, which is a liquid, undergoes, by this operation, resolution into its component parts, and turns to gases, heat ought to be absorbed in greater quantity than it is evolved; and, therefore, unless caloric is evolved, and in sufficient quantity too, from some other source than the water, the ignited charcoal will certainly be cooled so far as to be extinguished by it. The phlogiston (hydrogene) of water is blended with it in a way very analogous to the union of the same ingredient in iron. Water, like iron, is an inflammable substance in certain circumstances; but both require a supply of heat ab extra, to make them burn. Your father-in-law was, therefore, injudicious in having spent his money in making such an experiment. With a little more consideration he might have foreseen the experiment would be unsuccessful. He might almost as well have expected to have blown

up the flame of his forges by the phlogiston of the iron as of the water. To evolve heat enough to decompound a great quantity of water, would unavoidably require the consumption of a proportionally great quantity of fuel. The iron-master you mention ought, if there is any reality in my interpretation, to have sunk a part of his capital, in prosecuting this project of kindling fire by the eolypyle. If I was to attempt a nice distinction, I should say water and iron were rather *combustible* than *inflammable*. The reason why oil burns more easily than water, is, that its phlogiston (hydrogene) is in a more separable state; much water is formed during the process of its junction with oxygene as it burns.

As to the current of air which you observe accompanies the current of water from the orifice of the pipe, I am disposed to think it is not the chief cause of the phenomena to which I allude. The spot of ignited charcoal is brightest where the hot steam touches it, and not in the spaces round about, where, according to your interpretation, the brightest appearance ought to take place. The very spot covered by steam on the surface of a firebrand, or burning backlog, is not "extinguished as soon as if it "were dipped in cold water;" nor is there any blackness or sign of extinguishment observable, as long as a sufficient heat is kept up. If the heat be considerably abated, the water will indeed put out the fire; but this is no objection to the accommodation which I propose; on the contrary, it is one of the natural consequences of it.

If, in the experiments you have made upon metals, all that you have tried, when revived, imbibe great quantities of inflammable air, I have only to say, in such cases, the thing you denominate a metal, quick-silver for instance, is not in that case a *simple* body, but a *compound* of mercury and phlogiston; and so of all the rest which are found to contain it. You would not, however, thence argue, per saltum, that it must be an ingredient in such metals as contain it not, or in which it cannot be detected. I do not see the propriety or use of solving the question by analogy.

On the composition of finery cinder, you and I are nearly agreed, as I believe it to consist of *oxygene, phlogiston (hydrogene)*, and *iron*, and you think it is composed of *water* and *iron*. You allow, also, that phlogiston is essential to the constitution of inflammable air—so do I.

The experiments deemed so conclusive by most modern philosophers, on the constitution of water, and doubted or denied by yourself, put an end to all discussion on that subject, until both parties shall agree upon the facts. The antiphlogistians say it consists of hydrogene (phlogiston) and oxygene, in certain proportions: you say these two substances, by their union, form nitrous acid. There must be a mistake somewhere. Without pro-

nouncing absolutely on which side it lies, I have, in my speculations, proceeded upon the supposition, that, in this case, the English, French, and Dutch experimenters were right.

A reform in the language of science proposed to philosophers for their adoption, required some apology, and particularly from me. I offered what I thought a sufficient excuse for the innovation. It has always seemed to me a peculiarly difficult, and, at the same time, important task, to fabricate a scientific language as it ought to be. The notions we have of the primary particles, or elementary atoms, of which natural bodies consist, so much resemble abstract ideas, that, after the manner of these, they may be expressed by something like generic terms, only with this difference, that in such cases as the present, the words or names employed must have exact and unambiguous meanings. It has been fashionable to derive them from the Greek language. To this I have no objection. Perhaps it is the most proper. The neuter adjective, with an article prefixed, has a peculiar elegance and significancy. If the ancient terms, τὸ καλον be translated to mean that which is *beautiful to the eye*, τὸ πρεπον, *what is becoming in manners*, τὸ καθηκον, *what is right in morals*, &c. then the modern phrases, τὸ σηπλον, may be used to signify *what peculiarly disposes bodies to rot*, τὸ φλωγιστον, what *makes them burn with blaze*, &c. &c.

According to these philological ideas, I proposed, in 1795, to strike out *azote* from the nomenclature, and take *septon* in its place. This altered the terms considerably, as you observe:

1.	2.	3.
ΤΟ ΣΗΠΤΟΝ for Azote, Nitrogen, Alkaligen, &c.	Septous Gas for Atmospherical Mephitis, Azotic Gas, Phlogisticated Air, &c.	Gazeous Oxyd of Septon, or Septous Oxyd, for Dephlogisticated Nitrous Air.

4.	5.	6.	7.
Septic Gas for Nitrous Gas.	Septous Acid for Red or smoking Nitrous Acid.	Septic Acid for Pale or oxygenated Nitrous Acid.	Septates, Septites } of Potash, Lime, Soda, &c. for Nitrates, Nitrites } of, &c. &c.

This amendment was proposed, that the history of putrefaction, and the doctrine of pestilential fluids might be better understood.

Last year I proposed a further reform; to expunge *hydrogene*, and substitute *phlogiston* in its stead. This makes also a considerable change in terms; for instance, it is proposed to adopt

1.	2.	3.
ΤΟ ΦΛΩΓΙΣΤΟΝ instead of Hydrogene or Basis of Water.	Phlogistous Gas instead of Inflammable Air or Hydrogenous Gas.	Oxyd of Phlogiston instead of Water or Oxyd of Hydrogene.

4.	5.	6.
Phlogiſtous and Phlogiſtic Acids.	Phlogiſtates, Phlogiſtites, } &c.	Phlogiſtures of Iron, Zinc, &c. inſtead of
Probably no ſuch compounds in nature, oxygene being capable of uniting with phlogiſton	No ſuch things known.	Combinations of Phlogiſton with the peculiar earths of thoſe metals, &c.

to the point of oxyd, and no further. Here it ſtops ſhort. A curious and wonderful proviſion, which prevents water from receiving a ſurcharge of oxygene, and being turned ſour in all caſes!

And this amendment is proposed to render the history of combustion more easy to be comprehended, and to explain away the differences and difficulties about the principle of inflammability.

How far the project will answer the intended purpose, the men of truly learned, logical, and scientific heads must decide. For the same reason that azote and hydrogene were faulty terms, I consider oxygene to be so too. There must also be a reform in this article of the Nomenclature. But I offer nothing about it yet.

The new experiment, mentioned in your letter of the 14th of June, 1798, on Zinc, exposed to the focus of a burning lens, is, indeed, difficult to be explained upon the antiphlogistic plan; but this, as well as the production of inflammable (phlogistous) air, during the dissolution of metals in acids, squares entirely with the explanation contained under the heads "*Zinc*" and "*Iron*," in my letter of November 14, 1797. (1 *Med. Repſ.* p. 514, and seq.)

It would give me great satisfaction that we could settle the points of variance on this subject; though, even as it is, I am flattered by your allowing *my* attempt "to reconcile the two theories to be ingenious, plausible, and well-meant." Yet, after all I have written, I fear you will still think they *cannot* be reconciled; consequently the labour of those who undertake it is thrown away; they toil to no purpose:

> In vain, tho' by their powerful art they bind
> Volatile HERMES, and call up, unbound,
> In various shapes, old PROTEUS from the *Sea*—
>
> MILTON.

I learn, from France, that their leading chemists persist in considering the composition and decomposition of water established upon PROOF DEMONSTRATIVE; and that Berthollet is now in Italy.

Your idea of carrying on a philosophical discussion in an amicable manner, is charming; and the discussion between yourself and Dr. PRICE proves you to be a proficient in that mode.

With sentiments of high respect,
I remain truly yours,
SAMUEL L. MITCHILL.

ARTICLE XIII.

An Inquiry concerning CUTANEOUS PERSPIRATION, *and the Operation and Uses of Sudorific Remedies.*

By EDWARD MILLER, *M. D.*

IT is not intended, at present, to devote much attention to a physiological view of the cutaneous perspiration. This would lead to great length of detail on many points sufficiently discussed in common books, and is not necessarily connected with that particular survey of the subject now to be taken. Under the term perspiration will be included all the varieties of the cutaneous discharge, as well the subtile vapour called insensible, or aëriform perspiration, as the same matter condensed on the skin into visible drops, and called sweat; because both are supposed to issue from the same sources, and are only to be distinguished, as to component materials, by the latter being mixed with the sebaceous matter of the skin. The labours of Sanctorius, and others, to ascertain the quantity of fluid exhaled by this outlet, are proofs of uncommon diligence and perseverance; but are rendered uncertain in their result, and nearly fruitless, by inattention to the antagonizing function of the absorbents. Enough, however, has been discovered to demonstrate that great differences, with respect both to quantity and quality, arise from climate, season, weather, age, sex, temperament, diet, customs, manners, &c. The principal uses of perspiration seem to be, to preserve an equilibrium between the fluids and solids of the system, and, perhaps, to permit the escape of certain useless matters—to keep the skin moist, soft and pliable, in order to maintain its easy flexibility in the active motions of the limbs and body, and, at the same time, to preserve the accuracy of the sense of touch—and, lastly, to diminish the effects of increased excitement, by moderating the heat and excessive action of the skin, and thereby to preserve the whole system more cool and temperate.

There is scarcely a function of the human body, whose various conditions are so often mentioned as the cause of diseases, and the means of recovery, as the cutaneous perspiration. Physicians, and, in imitation of them, most others, ascribe to the vicissitudes of this discharge a long train of morbid and fatal consequences; and, upon the restoration or increase of it, they every day erect most important indications of cure. Much is said of the mischief of a suppression of perspiration; of the retention of morbific matter;

of plethoric accumulation arising from a stoppage of the pores of the skin, producing congestion and inflammation in different viscera; of the good or bad effects of a moist and relaxed, or of a dry and rigid skin; of the benefits of determining to the surface of the body; of the efficacy of sweating, &c. And it is well known, that in many interesting and critical states of fevers, the treatment is chiefly confided to diaphoretic remedies. But many of these opinions, however venerable for their antiquity, or the number and eminence of their advocates, appear, at best, to stand on doubtful ground; or, rather, must be pronounced inconsistent with principles now generally admitted. To such persons as have renounced those opinions, and embraced a more rational and enlightened pathology on this subject, some apology is due for this inquiry. If the writer had not reason to conclude, that a large majority of the physicians and people of this country still adhere to those opinions, and that the practical influence of them is now very extensive and pernicious, he would have declined to impose the present remarks on the reader.

Cutaneous perspiration has been supposed to bear an interesting relation to two important objects—the operation of cold on the animal system—and the critical solution of febrile diseases. By many, what is called *catching cold*, and *obstruction of perspiration*, are often indifferently used as phrases of the same import; and it is commonly believed, that the former depends upon a suppression of the usual discharge of the perspirative vessels of the skin, and may be relieved by a restoration of that discharge. It is also generally supposed, that the sweating stage of fevers is critical to the hot stage; and, therefore, that promoting perspiration is a leading object in the treatment of such cases.—Passing by other views that might be taken of this subject, it will be the chief design of these observations to oppose those two opinions, which are presumed to be erroneous and mischievous.

In stating the doctrine concerning the operation of cold on the human body, it is admitted by all to be a most productive source of disease. Sydenham did not over-rate the noxious effects of it, when he asserted them to exceed the combined ravages of war, famine, and pestilence. It is also admitted, that cold, applied to the skin, in any considerable degree or duration, will always more or less diminish perspiration; but it is denied that the inflammatory diseases thence resulting are produced by this diminution.

Great variations of the quantity of perspiration are well known often to take place without any morbid consequences. Not to mention climate and season, which may be said only gradually to produce their changes, the different states of the weather sometimes suddenly lessen this evacuation, and yet no injury ensues. The urine and

perspiration are always ready to accommodate each other; every person will acknowledge this, who attends to the comparative quantities of these evacuations in summer and winter; and at any time the comparison may be made by giving to a person large draughts of any aqueous fluid, and alternately applying cold and heated air to his skin; as it will be found that the former determines the fluid to pass off by the kidneys, and the latter by the cutaneous pores. And besides the effects of temperature, the quantity of perspiration must be materially affected by different applications to the skin. Many of the ancients, and particularly the Greeks and Romans, were in the habit of applying oil to the skin, after bathing; and the Athletæ rubbed a composition of oil and wax, mixed with some agglutinating and aromatic substances, over their bodies, previous to their entering on the arena. Some nations have painted their bodies all over, as the Picts of North-Britain, who are generally said to have received their name from this circumstance, though it was certainly common to the other ancient inhabitants of Britain; and this custom, which, in a greater or less degree, is known to prevail among the savages of all countries, is still practised by the Indians of this continent, who anoint their bodies with bear's grease, mixed with a clay which resembles the colour of their skins.* The Hottentots smear themselves all over with grease. The large use of powder and pomatum among ourselves deserves to be mentioned, though the application of them, being solely to the head, cannot be supposed to produce much effect. These several practices have been more or less in use for time immemorial; they must all of them much diminish the quantity of perspiration; and yet no injury or inconvenience is alleged to have resulted. The conclusion, therefore, is unavoidable, that this discharge from the skin may be suddenly arrested, and remain so a long time, without disease.

But it is so far from being true, that inflammatory catarrh consists in a stoppage of perspiration, that it is commonly attended with an augmentation of that discharge. In the febrile state of catarrh, the cutaneous vessels possess a fulness and activity far beyond their natural condition; this is ascertained by the greater heat, redness and turgescence of the skin. Excessive energy of action produces correspondent excitement of vessels, which must consist in excessive oscillations, and, therefore, in increased force of the circulation of their fluids; of consequence, a greater quantity of blood is sent to the skin, and a greater quantity of perspirable matter secreted.† Nothing can plausibly oppose this conclusion, but the

* Rush's Medical Inquiries, vol. i. p. 16.

† Heat of the skin, in the common temperature of the air, always denotes an increase of perspiration, whether visible or not; because the heat is pre-

doctrine of spasm of the extreme vessels, mistaken for the collapse or inactivity of those vessels, arising from deficient stimulus of heat; but that doctrine is now generally relinquished as visionary, superfluous, and improbable. A further proof that this disease does not arise from obstruction of the cutaneous pores, may be derived from the inefficacy of copious perspiration in the treatment of it.

The opinion of the morbid operation of cold depending upon obstruction of perspiration, received a deadly blow from Brown's doctrine of the effect of stimulating powers applied to accumulated excitability; upon which is erected his theory of catarrh, and many other inflammatory diseases; and which explains a multitude of phenomena of the living system, otherwise unintelligible. This doctrine is founded upon a general law of animal and vegetable life. It is exemplified by the glow of the skin after cold bathing, and the redness of the hands after holding snow or ice; by the dazzling splendour of the sun in leaving a dark room; by the pernicious effects of much stimulant food on the stomachs of famished persons; by the gangrene of frozen limbs from the sudden application of too much heat; and, lastly, by a multitude of similar occurrences in vegetable life.* When, therefore, any part of the body has been exposed to cold, it becomes liable to be much more affected by heat, or other stimuli, than before such exposure. And this luminous principle, aided by the direct or reverse sympathy existing between associated actions in different parts of the system, will, it is conceived, be sufficient to explain all the phenomena of *catching cold*, without resorting to the mysterious and fanciful doctrine of obstructed perspiration. It is not merely with the view of combating a speculative opinion, which might have been considered harmless, and undeserving of notice, that these observations are made. To relieve the imaginary stoppage of perspiration, after exposure to cold, people are often observed to betake themselves to the use of warm or spirituous liquors, to confinement in close or hot rooms, and to a weight of bed-clothes, which must all greatly aggravate the disease.

The second branch of the subject now recurs; viz. the relation which the cutaneous perspiration bears to the critical solution of febrile diseases. It is an opinion sanctioned by high antiquity, and which prevails at the present day, that sweating is the principal means employed by nature, and, therefore, to be imitated by art, for effecting the critical solution of fevers. It is not surprizing that this doctrine should have become so prevalent, when it is recollected how commonly the coincidence is observed between

duced by the increase of secretion. It follows, that a defect of perspiration can only exist when the skin is cold. Darwin's Zoonomia, vol. ii. p. 699.

* Facts of this kind may be found in the Botanic Garden, part ii. p. 31.

sweating and a favourable crisis. The opinion of Sydenham, that fever is an effort of nature to discharge something noxious from the system; the lentor and morbific matter of Boerhaave, and the spasm of Hoffman and Cullen, have all had a share in attaching undue importance to cutaneous perspiration, and in supporting the critical subserviency of sweating to the hot stage of fevers. The mere coincidence, however, of sweating and crisis, cannot be deemed sufficient to establish the relation of cause and effect. And the doctrines of the celebrated authors just mentioned are too hypothetical, and too irreconcilable with numerous facts and phenomena, to admit of defence in the present state of medical science. It is to be lamented, indeed, that many who are emancipated from the hypotheses of those authors, are still enslaved by their language and practice. Error does not always yield to truth, when the foundation on which it rose is known to be dissolved.

It will not be difficult to maintain, that during the hot stage of fever, no stoppage of perspiration takes place—and that, even if such stoppage were admitted to exist, the matter of perspiration contains nothing whose retention, during that stage, can be supposed hurtful to the system, or whose elimination can hasten the critical solution.

An eminent pathologist* has placed the former of these positions in a clear point of light. He asserts, that the matter of perspiration is secreted in as great, or perhaps a greater, quantity during the hot fit of fever, than towards the end of it, when the sweat is seen upon the skin. He ascribes the dryness of the skin, in the hot fit, to the more energetic action of the cutaneous absorbents,† which re-absorb part of what is secreted, and to the greater heat of the skin evaporating the remainder. He refers the appearance of sweat, at the decline of the fever-fit, to the continued energy of the secreting vessels, actuated by all the heat of the interior parts of the system, and of the circulating blood; while the mouths of the absorbents, cooled by the external air and bed-clothes, much sooner lose their increased action. And thus, after an able discussion of the subject, he concludes that sweats are not critical to the hot fit any more than the hot fit is critical to the cold fit; that they are merely the natural consequence of the decline of the hot fit, flowing from the diminished action of the absorbents, and the diminished evaporation from the skin; and that profuse sweats, at the decline of fevers, occur more frequently than copious urine or

* Dr. Darwin's Zoonomia, vol. ii. p. 19 and 20.

† I am aware that the abſorbent power of the ſkin, except when aſſiſted by friction, is queſtioned by M. Seguin, and other reſpectable phyſiologiſts; but the facts in ſupport of it are ſo numerous and deciſive, that my doubts are all removed.

diarrhœa, because the cutaneous absorbents, exposed to the access of the external cool air, sooner abate of their increased action than the urinary or intestinal absorbents. The clear and decisive reasoning by which these opinions are defended, will be seen at large in the work referred to above. The doctrine, therefore, that the material cause of fevers is retained and shut up, during the hot stage, by the heat and dryness of the skin, will, at least, be considered as improbable.

But if it were even admitted, that the perspirable matter is confined within the system during the hot stage of fever, it cannot be legitimately inferred, that such retention becomes noxious, or that the elimination of it would produce the critical solution. This matter does not appear to be *excrementitious;* if that epithet be used to signify matter acrid, corrupted, or hurtful, in case of being retained in the body. On the contrary, it is bland, inodorous, and insipid, in its natural state. And, considering how incessantly and plentifully it is emitted from the whole surface of the body, it will readily be seen how inconvenient and disgustful the society and near approximation of the bodies of men would have become, if nature had not exempted it from the fœtor, and other excrementitious qualities of the urine and fæces. The diminution of it by oiling the skin, and the suppression of it by painting, &c. prove that its constant and equable discharge is not necessary to life or health. There can be no doubt that its principal uses are to preserve the softness and pliancy of the skin, and the accuracy of the sense of touch; uses implying qualities very remote from excrementitious. A great proportion of it is known to be habitually absorbed in the moment of excretion, without inconvenience or injury; and no material difference has yet been proved to exist between this matter of perspiration and the moisture which bedews and lubricates all the internal membranes of the body, and which is always entirely absorbed in a state of health. It is, indeed, true, that the perspirable matter of the lungs, apparently the same as that emanating from the skin, and also that of the axillæ and feet, sometimes emit a disagreeable odour. But this depends so much upon constitutional and morbid peculiarities, or upon want of cleanliness, that it can furnish no sufficient ground to establish principles different from such as are here contended for.

If the matter of perspiration, whether aëriform or aqueous, be subjected to chemical analysis, it will be found to contain nothing that, in case of occasional retention, could be likely to prove prejudicial to the system. Mr. Abernethy* found the aëriform discharge from the skin to consist of carbonic acid gas, and azotic gas; the former constituting somewhat more than two thirds, and the latter

* Surgical and Philosophical Essays, part ii.

a little less than one third. Neither of these gases can be supposed to be noxious in the quantity retained by a temporary suppression of the cutaneous perspiration. Carbonic acid gas, and the materials of which it is composed, are always present, in considerable quantity, in the animal constitution; carbone is one of the principal ingredients of food; carbonic gas is plentifully found in a variety of the common fermented liquors; and it is known to be an efficacious remedy in many diseases.—Azotic gas is the most abundant ingredient in the atmosphere: in a variety of ways it gains admittance into the system, and enters largely into the composition of animal matter: and, though it may, in some instances, morbidly predominate in the body, it is certainly, on the whole, to be considered rather as a nutritious than a noxious or excrementitious substance. In examining the perspirable matter, under the aqueous form, Mr. Abernethy observed it to be a limpid, tasteless water; after evaporation of one half, it had a very slight saline taste; no change appeared after standing many days; and the mixture of some of the most noted agents in chemistry produced no visible alteration.

If the foregoing facts and reasoning are well founded, it must be concluded, that the powers and usefulness of sudorifics in fevers, have been misunderstood, and that great abuses have arisen in conducting the practice of them. Accordingly, some of the most judicious practitioners have always inveighed, with great force, against these abuses; their remonstrances have produced much conviction, and effected many salutary restraints. In opposing the common practice respecting sudorifics, it will be understood, that reference is generally had to that kind of sweating which is excited by forcible means, by the application of external, or the confinement of bodily heat, or by the internal use of substances directly stimulant. When excited by emetics, in nauseating or full doses, or by any other means which directly diminish action in the system, it is understood to be an effect of a different kind, and not liable to the objections now offered to the practice of forcing sweats.

Inflammatory, malignant, and pestilential fevers exhibit some of the most striking instances in which sudorific remedies have been recommended, and in which they have produced the most pernicious abuses. Experience, though ample and impressive, has by no means universally corrected this error. And as this country, for several years past, has been unhappily subjected to epidemic fevers of this description, not only presumed mistakes in the treatment of them, but erroneous opinions also, become interesting matter of disquisition.

The ravages of the fevers just mentioned are but too well known. Without undertaking to inquire into all the modes in which a fatal

termination of them may be apprehended, there are two which probably will not be controverted—1st. Organic derangement of some viscus essential to life—or, 2dly. General exhaustion of vital power, or the principle of excitability. The former is commonly effected by the violent impetus of the blood's circulation, determined to particular viscera, and accomplishing the fatal event by the instrumentality of congestion, engorgement, effusion, &c. and the latter, by that excess of stimulation which is the sum of all the inordinate actions resulting from the disease.

No person can deny that sudorifics, operating by means of external heat, or other direct stimulants externally or internally administered, have a tendency to produce or to aggravate such effects. The disease itself manifests a strong disposition to exert its violence in this topical derangement, even when moderated by all the remedies best adapted to allay excessive action. The delicate texture of many of the viscera is ill suited to repel an attack, from which even the strongest can scarcely escape without a fatal breach. To attempt to excite sweating by powerful stimulants, in this state of the system, without copious evacuations from the blood-vessels and bowels previously used, is as preposterous as to endeavour to extinguish flame by the pouring on of oil.

And if, instead of a fever of such destructive impetuosity, another present itself, distinguished by debility, prostration, and all the symptoms of exhausted excitability, what benefit can be expected from a remedy calculated directly to aggravate the disease, and to hurry on the fatal event? By the operation of sudorifics, not only the capillary vessels of the skin, but, through the medium of sympathetic association, all other parts of the secerning and arterial system are excited to greater action; but the smallest increase of fibrous contraction cannot be produced without a correspondent expenditure of vital power; or, in other words, a correspondent increase of the disease. With all the saving of the principle of excitability that the most cautious management is able to effect, the feeble and exhausted frame can scarcely sustain the functions of life;—why then diminish, by an exhausting remedy, what is already too scanty, and, at the same time, all-important to existence?

It is by no means, however, intended to assert that sudorifics are always useless or pernicious. On the contrary, they may be very advantageously employed to obviate the return of the cold paroxysm of fevers; they will render great service in many chronic diseases attended with general debility, and especially with cold and pale skin; they will form a remedy of great importance in many cases, by producing a transfer of excitement from the diseased part or organ, to the skin—and in a multitude of other instances not necessary to be mentioned here.

Even in fevers, sudorifics may be frequently employed with success. The cure which nature has provided for the increased exertion of the system, consists in the consequent expenditure of excitability. All cases of fevers, occurring during the prevalence of mortal epidemics, are not equally malignant; on the contrary, many instances of a mild and transient disease are observed even in the plague; and, in the yellow fever, this still oftener takes place. On this point, it is probable, the efficacy and reputation of sudorifics will be found to rest. In all such febrile cases, therefore, as are moderate in their attack, as do not, on the one hand, by the violence of re-action, threaten local organic destruction, nor, on the other, rapidly to exhaust the principle of excitability, sweating may be excited with safety, and, if used early in the disease, may often speedily terminate it with complete success. And even in fevers of greater violence, after sufficient evacuations from the blood-vessels and intestines, the operation of sudorifics may be sometimes efficacious, by gradually expending the morbid surplusage of excitability—by invigorating the absorbent function, and thereby obviating the tendency to engorgement and effusion—by the mitigation of heat arising from the evaporation—and, finally, by that agreeable softness and relaxation of the skin, which commonly attends the aqueous form of perspiration. These advantages will often more than compensate for the addition of stimulus which sudorifics impart to the system.

The efficacy of this class of remedies, in rheumatism, has been supposed to afford the most decisive and triumphant testimony of their virtue. Long experience, and a comparison of this mode of treatment with many others, leave no room to doubt the propriety of the preference given to them. Still, however, it may be justly contended, that the operation of sudorifics, in this instance, is chiefly indirect; that their usefulness greatly depends on the preparation of the system by previous remedies; and that this example affords only ambiguous ground for extending the employment of them as a general remedy in fevers.

Sudorifics, in rheumatism, appear gradually to expend the superabundant excitability, by the increased action they induce; which may be effected the more safely in this manner, as the seat and disposition of the disease give no reason to apprehend a derangement of the vital organs. It is probable this remedy does much also, in this disease, by increasing the energy of absorption. If used early in the disease, without considerable previous evacuations by bleeding and cathartics, it is said evidently to protract and primarily to exasperate the pain and other symptoms. It must, indeed, be admitted, that this remedy will often alone effect a cure, on the principle before mentioned, if the long and painful process necessary in such a circuitous plan of treatment, can be resolutely

persisted in. That it acts chiefly by increasing absorption, is rendered probable by its distinguished efficacy, when employed immediately after the inanition induced by blood-letting and cathartics; and this opinion is confirmed by observing that the most copious and repeated bleeding and purging will not readily relieve rheumatism, unless sudorifics, mercury, peruvian bark, or some other remedy suited to increase the energy of the absorbents, be speedily superadded. The same opinion is also further corroborated by the success of compression by bandages, in discussing any obstinate remainder of the disease, affecting the limbs, after sudorifics, &c. preceded by blood-letting and cathartics, had been faithfully employed.

Notwithstanding these concessions in favour of sudorifics, it may justly be insisted upon, that perspiration, carried to the extent of sweating, is generally, more or less, a sign of indirect debility. Few animals exercise themselves so as to induce visible sweat, unless compelled by mankind, by the apprehensions of fear, or the cravings of hunger. The debilitating effects of it are to be constantly observed in the human system. Witness the languor produced by exercise in warm weather, especially in persons unaccustomed to exertion in the heat; and yet more in labourers, in hot climates, after vigorous toil, and profuse sweating, through the day. Witness the pale and sickly countenances, and short lives, of workmen, whose occupations condemn them to endure high degrees of heat, as in furnaces, glass-houses, &c. The inhabitants of hot climates, who perspire profusely, are defective in vigour, and generally short-lived; the waste of excitability in the excessive and useless exertions of the cutaneous vessels, is probably one principal ground of premature infirmity, and of short life.*

That sudorifics cannot be usefully employed as a general remedy in fevers, is apparent from the fatal course pursued by many of these diseases, notwithstanding the most copious, universal, and continued sweats, spontaneously taking place. The memorable sweating sickness, which first appeared in England, towards the close of the fifteenth century, and was one of the most fatal epidemics on medical record, affords ample proof of this position.

On the whole, it may be concluded, that much of the use of sudorifics has arisen from mistaken doctrines concerning the nature

* M. Buffon made a curious experiment to shew this circumstance. He took a numerous brood of the butterflies of silkworms, some hundreds of which left their eggs on the same day and hour; these he divided into two parcels; and placing one parcel in the south window, and the other in the north window of his house, he observed, that those in the colder situation lived many days longer than those in the warmer one. *Darwin's Zoonomia, vol. ii. p. 24.*

of perspiration and of fever—particularly from the erroneous opinions, that the matter of perspiration is excrementitious; that its occasional obstruction is noxious; that it ought, as much as possible, to be eliminated from the system; and that it is only carried off in considerable quantity when discoverable by sight or touch.

It may be also concluded, that sudorific remedies, especially those of more powerful kind, are, in general, highly unsafe, and calculated to augment the violence of inflammatory and malignant fevers; and that, although they may succeed in some cases of less violence, or by a favourable concurrence of circumstances, yet they are so constantly liable to produce mischief and exasperate the disease, that the abuse, on the whole, must be pronounced greatly to exceed the use.

AFTER this attempt to restrict the use of sudorific remedies to such narrow limits, it may not be improper to recall the reader's attention to a substitute better adapted to the nature, circumstances, and varieties of fevers. This substitute is water, of various temperature, taken into the stomach, injected into the bowels, and applied to the surface of the body. Many endeavours have been made, to bring this inestimable remedy into more common use; hitherto, indeed, without much success; but it is to be hoped, that the time now approaches when its efficacy will no longer be disdained on account of its simplicity and cheapness.

The causes of fever would be infinitely less pernicious to the system, if the fever itself were repressed in its first movement, or annihilated in embryo. The cool treatment of the small-pox gives an example of this suppression of a disease; but physicians have never yet sufficiently availed themselves of the instruction it affords. Notwithstanding all the complicated maxims and rules of medical practice, the genuine treatment of fevers is simple; it chiefly consists in reducing the heat of the system when too high, and increasing it when too low; the former will allay the existing excessive action, which threatens organic destruction of the more important and delicate viscera, or an eventual exhaustion of the principle of life; and the latter will obviate such accumulation of excitability as may endanger the system from the violence of subsequent re-action. The element of heat, one of the most universal and enlivening agents yet discovered in nature, which surrounds and pervades all bodies, and regulates many of the principal circumstances of animal and vegetable life, deserves a primary attention in the management of fevers. Excepting a few precipitate cases, where the noxious cause mounts, at once, to the source of life, and suddenly extinguishes the vital principle, it will be found, that heat is the chief instrument by which the febrile poi-

son executes its destructive work. Heat and the arterial tumult reciprocally sustain the relation of cause and effect, and too often proceed in augmenting each other till life is destroyed.

It is by no means intended to undervalue the importance of depleting remedies in excessive arterial action; they are often indispensible; they deserve the highest confidence; and, especially as preparative for the use of other means, they must, till medicine advances some steps further, generally lay the ground-work of the treatment. But a great proportion of the depletion otherwise necessary might be spared by the adoption of the pleasant, simple and powerful application now recommended.

If, indeed, the sick could always avail themselves of the utmost efficacy of water, it might, perhaps, become as universal an extinguisher of fever as of fire. The use of cool air, in fevers, forms an æra in the history of medicine. The use of water, cold, tepid or hot, so as to suit the varying degrees of heat intended to be diminished or increased, may form an æra of greater importance. If too much action prevails in any part, or in the whole system, it may always be speedily reduced by water of appropriate temperature. If chilliness and torpor are found in particular parts, or in the whole, the partial or general application of water, of proper warmth, will be one of the most direct and expeditious means of procuring relief. In most fevers, the action of the sanguiferous vessels is plainly either excessive or deficient; and so close a dependence has this morbid action upon the heat of the body, that a steady and efficient regulation of that heat, lowering excess and supplying defect, would certainly bring that action to a proper point, and there render it stationary.

Cool air has been justly deemed an invaluable remedy in fevers; but air is comparatively a bad conductor of heat. Irreparable mischief may be produced before it can adequately operate; and, in some seasons and countries, it would be impossible to obtain it of the requisite degree of coldness. Water, eight hundred times denser than air, and conducting heat with proportionable celerity, must be much better adapted to produce a powerful effect in the system. The force and rapidity of the operation of cold water may be estimated by considering the consequence of plunging a person, in perfect health, whose excitement is supported by every due degree of stimulus, naked, into water of a degree of cold at or under the freezing point. Life would be almost instantaneously extinguished. And if this extreme effect could be so suddenly induced, is there not sufficient warrant to assert, that all inferior effects might be produced by a cautious and graduated application of the same remedy?

There is good reason to believe that hot weather and febrile diseases increase the heat much more upon the surface than in the

internal parts of the body, where the temperature is nearly stationary. Mr. Hunter's experiments on the heat of animals, as existing in inflammation of various parts of the body, and measured by the thermometer, establish this fact.* The skin is more susceptible of increased heat, in diseases, than any other part, because, in a state of health, it is actually cooler, and, of consequence, possesses a greater accumulation of irritability than the internal parts. The comparative coolness of the skin must be ascribed to its exposure to a medium commonly much cooler than itself, and to the quantity of heat continually absorbed and borne off by the evaporation of the perspirable matter. And perhaps it may be true, with respect to the cold as well as the hot stage of fever, that the skin is principally and extraordinarily affected.

If, then, it be admitted, that the operation of heat is so important and mischievous in febrile diseases, and, likewise, that this excessive heat is chiefly exerted upon the superficial parts of the body, a great additional encouragement is derived to rely upon the efficacy of the application of water.

But, in order to give the sick the utmost advantage of this remedy, and to avoid laying too much of the stress of its operation upon particular stages of febrile affections, these affections must be surveyed in their utmost latitude, and appropriate degrees of heat or cold applied to the skin and other parts at seasonable periods. For example; the application of heat in the torpid or cold stage of fever, is as important as that of cold in the hot stage; and, by attending promptly to the former, more efficacy and less difficulty will be found in the latter. By neglecting the former, the disease strikes a deeper root, time is lost, and much more energy, or rather violence, is requisite in the subsequent measures.

Not only warm water, but, perhaps, other external stimulants, might be usefully employed in arresting the cold stage of fevers; among these may be reckoned alcohol, spirit of ammonia, æther, &c. which may always be kept ready for immediate use, and whose application to the skin could be productive neither of trouble nor danger. The doctrine of the hot being a natural and necessary consequence of the cold fit, and the common appearance of proportion between them in extent, degree or duration, give countenance to the use of this kind of remedy. The usefulness of arterial compression, as recommended by Mr. Kellie,† in lessening and shortening the cold stage of intermittents, and, by consequence, the whole paroxysm, suggests another remedy of similar kind, and strongly confirms and illustrates the general principle.

* Hunter's Treatise on the Blood, Inflammation, and Gun-shot Wounds, vol. ii. p. 20.

† Duncan's Medical Commentaries, vol. xix. p. 155.

With respect to the precise temperature of water, applied externally or internally at the different stages of a febrile paroxysm, alternately to restrain defect and excess of heat, much is probably yet to be learned. In general, it may be observed, that a degree of heat from 96 to 100 of Fahrenheit's thermometer, will be necessary in the stage of chilliness; and, in the hot stage, 95, or any inferior degree, as prudence may dictate, will produce a cooling effect. The use of very cold water will probably be seldom necessary or adviseable; as too sudden transitions from high to low temperatures are not requisite to produce the desired effect, and, in some cases, may possibly be productive of mischief.

The mode of applying water of various temperature to the skin of sick persons, without obliging them to leave their beds, and without inducing the least fatigue, opens a wide range for the exertion of ingenuity and invention. Sheets of oiled silk might probably be used for this purpose with great advantage; and the application of blankets and sheets, or body-linen, previously wrung out of water, at the same time causing a proper degree of ventilation to be maintained, would regulate at pleasure the heat of the patient's skin.* Damp or wet linen and sheets would, in this case, produce exactly the same effect, employed as a remedy, which they produce in bringing disease upon healthy persons; the different relative circumstances of the body, in health or in fever, form the substantial difference, and render the same application, in one case, highly pernicious, and, in the other, highly salutary.

The appropriate temperature of the water, varied with every change in the condition of the system, and always regulated with the greatest exactness of graduation, will supersede the necessity of many cautions and restrictions in the application, concerning the particular stage of the paroxysm, the chilliness or heat of the skin, the presence of perspiration, &c. which would demand much minuteness of detail, and exceed the limits prescribed to this inquiry.

* Examples of the remarkable efficacy of the external application of water may be found in Bruce's *Travels to discover the Source of the Nile*, vol. iii. p. 33; in Dr. Jackson's *Treatise on the Fevers of Jamaica*, p. 270; and in Dr. Rush's *Medical Inquiries and Observations*, vol. iv. p. 92.

REVIEW.

ART. I. *A Treatise on the Action of Mercury upon living Bodies; and its Application for the Cure of Diseases of Indirect Debility.* By *Charles Maclean.*

[*Continued from vol. i. p. 450.*]

THE first part of this division of the work before us is devoted to a narrative of the author's practice and opinions, in respect to the use of mercury in febrile diseases, and others of indirect debility, for nearly ten years past. This is done not only to disseminate a knowledge of the virtues of this remedy, but also to assert, by reference to dates, his claim to such share of the merit of this discovery as the public may eventually adjudge. But as it is not necessary, on the present occasion, to enter into an examination of rival claims on this point, we shall wave the question, and proceed to the more important objects of the treatise.

From all his observations concerning the use of mercury, the author concludes that it operates by a stimulant power, and thereby cures diseases of indirect debility in their various degrees—that, used in excess or irregularly, it will itself induce a state of indirect debility of various degrees, indicated by ulcerations of the throat, soreness of the mouth, salivation, purging, sweat, increased flow of urine, &c. all which symptoms arising from the irregular action or sudden subduction of the remedy, should be avoided as far as possible, and may be cured by the same or other exciting powers applied in suitable degrees—that, in diseases of high degree, it will be safer to run the risque of producing such inconvenient effects than to exhibit under doses of the medicine—that the duration of the action of each dose appears to be not less than one, or more than two hours, and that such duration, when more exactly ascertained, should be the period of the repetition of the dose, in order to support the excitement—that it is probable mercury will be found useful in the plague, on the same principles as in fevers, dysentery, &c.—that recovery always took place, in the cases observed by the author, when an increased flow of saliva succeeded the use of this remedy—that all cases in which ulceration of the gums, fauces and tongue, or a discharge of blood from these parts, occurred, without being accompanied or succeeded by an increased flow of saliva, terminated in death—that in all the cases which, under these circumstances, terminated fatally, exten-

sive local disease of the abdominal or thoracic viscera, or both, was found upon dissection—and, finally, that lesion of particular organs, rendering them unfit for the performance of their proper functions, is the state which constitutes an incurable disease, when the foregoing principles are judiciously applied.

In these opinions and conclusions of our author, concerning the operation of mercury, we recognize much important truth, and, in our judgment, much error. In the belief of the efficacy and general suitableness of the remedy, in diseases of indirect debility, we entirely concur; and we also subscribe to the doctrine of the failure of it being chiefly referable to that visceral derangement and destruction which is a common consequence of violent febrile disorders, when improperly treated. The occurrence of such local disorganization, in the dissection of bodies dead of those diseases, and wherein mercury had failed of producing its usual effects, is a fact so instructive and pregnant with consequences, that it is to be hoped it will be duly impressed on the mind of the reader.

But we cannot agree with the author in thinking that mercury acts merely by a general stimulant power, or, in other words, only by increasing or supporting the excitement of the whole system. If this were admitted, electricity, heat, opium, alcohol, wine, and all others of the long catalogue of stimulants, would only differ from mercury in the degree of their stimulating powers respectively; which is a position contradicted by innumerable facts and uniform experience. This mistake is chiefly grounded upon the Brunonian principle, warmly espoused by the author, of the unity and equality of the states of excitability and excitement, throughout the whole animal system, at any given time; a doctrine which leads to pernicious consequences, and which we have combated, we hope satisfactorily, in the review of the first part of this work.

Neither can we suppose, with our author, that the evacuant effects of mercury are always injurious, and to be repressed with the utmost care. The cathartic power of calomel has been distinguished for its efficacy in expelling from the intestinal canal a variety of matters not easily carried off by other means. The use of mercury in the form of ointment, the constant combination of opium with calomel, and the author's hypothetical objections to depleting remedies, have, probably, all combined to prevent his observing the usefulness of his favourite medicine in the character of an evacuant.

We have seen nothing in the use of this remedy that could lead us to ascribe its evacuant properties, and particularly the power of exciting ptyalism, to the irregular exhibition or sudden subduction of it. The frequency of the dose, and the probability of ptyalism taking place, even from the ordinary intervention of sleep, would render it difficult to conform to any plan of using

this medicine, which, in the opinion of the author, would render the patient secure from such an event. Many arguments present themselves against this opinion; but we are content to leave the decision to future experience.

It has been supposed by many, that much of the efficacy of mercury, in the cure of diseases, is owing to a transfer of morbid excitement from one part of the system to another, or, as it is often expressed, to the creation of a new action. Many phenomena render this opinion probable. But the principle of the unity and equality of excitement over the whole body, which the author stedfastly maintains, on the authority of Dr. Brown, would forbid him to listen to a doctrine founded altogether on the division and inequality of excitement.

To such as have duly considered the complicated structure of an animal body, and the great diversity of powers and functions incessantly exercised in it; and, above all, to such as have adopted the fundamental principle of Dr. Brown, concerning the increased operation of stimuli upon accumulated excitability, the following language of our author will be surprizing. "To draw blood, to have afterwards the pleasure of introducing more opium or mercury into the system, than could otherwise have been done; to debilitate in order to strengthen; to accommodate the patient's habit to the quantity of medicine that is to be given, rather than proportion the quantity of medicine to the state of the patient; these are rules so wonderfully sublime, that they can never be sufficiently admired!" A more improper ground for ridicule could scarcely have been taken. If the author had ransacked opinions and practices from Hippocrates to the present day, he could not have found one more impregnable than this on the score of argument, or more practically interesting to the safety and health of mankind. But, in addition to a multiplicity of other reasoning, and the still firmer basis of experience, we shall barely suggest in this place, that the explanation of the action of mercury, after copious blood-letting, by increasing the energy of the absorbent vessels, removes, in a moment, every difficulty, and reconciles this practice, which appears to our author so inconsistent and paradoxical, to principles the most sound and universally received. A more particular account of the action of mercury in invigorating absorption, and thereby disarming the violence of malignant fevers, will speedily appear under a different form.

ART. II. *Collections for an Essay towards a Materia Medica of the United States. Read before the Philadelphia Medical Society, on the 21st of February, 1798.* By *Benjamin Smith Barton*, M. D. &c. &c. Philadelphia. *Way and Groff.* 1798. 8vo. pp. 49.

PROFESSOR BARTON still prosecutes his favourite studies, and has now given us an account of some of the indigenous plants of our country, which promise to be useful in the practice of physic. Each new fact, and every discovery in the branch of natural history, acquires an additional degree of importance from its direct subserviency to the supply of human wants, and the removal of human infirmities. We are, therefore, well pleased to observe the author of the Essay before us pushing his inquiries beyond the labours of the BARTRAMS, COLDEN, KALM, and SCHOEPF, and displaying to the public the hidden treasures of the vegetable world. And what augments our satisfaction is, that this is the undertaking of a native American. Too long have we been indebted to foreigners for the best information concerning the plants of the western continent; and, even at this moment, the *German* student may obtain more exact accounts of the trees and shrubs of North-America from the untranslated works of WANGENHEIM and DU ROI, than our own youth can find in any publication, with which we are acquainted, in the *English* tongue. We trust the necessity of gaining from foreigners, from foreign countries, and foreign languages, information relative to the productions of our own soil, will be less and less urgent every day.

The author divides his subject into the ordinary heads of Food and Physic, or of *Materia Alimentaria* and *Materia Medica*. On the former he is very concise. He, however, mentions the esculent manna, or sugar exuding from the fruit of the Dwarf Palm, growing on Mobile River, in Florida; and the nutritious powder, or gelatinous substance, obtained by pounding and macerating in water, the roots of the Smilax China. Both these accounts are given on the authority of Mr. William Bartram. Much, however, remains to be done on this division of the subject; and we cannot but hope that some among our fellow-citizens will devote themselves to its elucidation and improvement. In respect to maize, the labours of our illustrious countryman, Count RUMFORD, have strikingly recommended it, for its nutritive qualities to Europeans; nor can we forget, though the allusion may be deemed more humorous than scientific, the elegant little poem of Mr. BARLOW. With regard to the chemical history of this vegetable, the experiments of the learned FRANCIS MIRABELLI, of Pavia, in his work, entitled, *De Zea Mayz planta analytica Disquisitio*, (an ac-

count of which Professor Barton will find in the 36th vol. of the Leipsic Commentar. de Rebus, &c. for 1794, part 3, p. 460), leave us little further to desire.

The second division of his work, the author subdivides into the following sections.

I. Astringents:—Under which he mentions the *Geranium Maculatum*, or Spotted Geranium, whose root, boiled in milk, is said to be an excellent medicine in the cholera of children; the *Heuchera Americana*, or alum-root, represented as beneficial in some obstinate ulcers, which have been mistaken for cancers; the *Actæa Racemosa*, or Black Snake-root, whose decoction is a good gargle in putrid sore throat, and is also a remedy for the itch; the *Uva Ursi*, as useful in old gonorrhœa, more advantageous in nephritis, and especially that form of this disease which depends upon gout; and the Liquidambar Asplenifolium, or Sweet Fern, as useful in diarrhœa.

II. Tonics:—The author thinks that our woods afford several medicines which may be substituted for the peruvian bark. Among these he mentions the bark of the *Oaks*, and particularly the Spanish Oak, of the *Wild Cherry-tree*, of the common Sassafras, and of the Persimmon or Medlar. He recommends also the barks of the *Willows* and *Dogwoods*, of the *Horse-Chesnut*, of the six species of *Magnolia*, of the *White-Wood* or Tulip-tree, and of the Aspin, as possessing similar virtues. He notices the *Snake-root*, and another species of *Aristolochia*, and encourages an examination of the *Gentians* of the United States.

III. Stimulants, or Incitants:—1. General stimulants. The resins of the *Populus Balsamifera*, or Balsam-tree, and of the *Liquidambar Styraciflua*, or Sweet Gum, which grows so abundantly in New-Jersey, and on York and Long-Island, are enumerated under this head. Here also are placed the *Datura Stramonium*, or James-Town-Weed, (concerning which some interesting information occurs in the present No.), the *Cicuta venenosa*, the *Rhododendron maximum*, and the *Kalmiæ* or Laurels, as narcotic or poisonous substances. The *Andromeda Mariana* is mentioned as a wash in ulceration of the feet, among the slaves in the southern States, and the *Gualtheria procumbens*, or Mountain tea, for relieving fits of the asthma. The two American species of *Laurus*, the Sassafras and Spice-wood, are also noticed; and *Ginseng*, *Eringo*, and *Arum*, or Indian or March Turnip. This list is certainly extensive; and we cannot but think that the *Ginseng*, a root which may be chewed all day, and swallowed in considerable quantities, without much effect of any kind, is admitted on too slight a recommendation. Some qualification might have been profitably annexed to the notice of the *Arum*. It is only in its *recent* state that this root can properly be termed *acrid*. When dried, it is freely grated and used, in

many country places, for the ailments of children, and for bowel complaints, without exciting more than a pleasant sensation of warmth on the tongue and stomach, and is far less pungent than the Calamus-root.—2. Topical stimulants. *Butter-nut* bark, *Moose-wood* bark, some of the *Ranunculi*, and several species of *Rhus*, are enumerated under this head, as possessing the power of drawing blisters, when applied to the skin. We are a little surprized, that in speaking of the efficacy of the *Rhus Toxicodendron*, as a vesicatory, Professor Barton has passed over, without notice, the evidence in its favour as a remedy in *paralysis*, exhibited in ALDERSON's publication.

IV. ERRHINES:—Tobacco, Euphorbia, &c. are ranked as Errhines.

V. SIALOGOGUES:—The *Seneka Snake-root*, and *Ash-leaved Tooth-ache-tree*, are particularly mentioned. We fully concur with Dr. Barton, that, "perhaps, there are but few of the incitant "medicines which may not be so managed as to salivate." It seems proper, however, to distinguish between that salivation which is excited by the application of stimulants directly to the mouth and fauces, and that which follows their internal exhibition. The salivation which succeeds the use of a corrosive sublimate gargle, is certainly a very distinct thing from that which is produced from the long-continued exhibition of mercurials. And, perhaps, there is no satisfactory evidence of such a salivation as this last having been induced by any vegetable substance, notwithstanding the testimonies relative to opium, &c.

VI. EMETICS:—The *Euphorbia Ipecacuanha*, *Spiraea trifoliata*, *Asarum Canadense*, *Eupatorium perfoliatum*, and *Sanguinaria Canadensis*, are noticed as native vegetable emetics. This last, we may add, has attained reputation in some parts of the country, as a remedy in chronic rheumatism. The author thinks some species of our *Violets* have roots endued with useful emetic qualities.

VII. CATHARTICS:—A number of plants are mentioned as possessing purgative qualities, of which the root of the *Podophyllum peltatum*, or Mandrake, and the *Butter-nut bark extract*, are the most remarkable.

VIII. DIURETICS:—Under this division, which contains some curious information, are mentioned the *Polygala Senega*, *Lobelia Syphilitica*, *Serratula spicata*, a species of *Ilex*, and the *Medeola Virginica*, or Cucumber-root. We have often eaten the root of the latter, which is very white, delicate, and tender, but without discovering any peculiar diuretic effect from it.

IX. ANTHELMINTICS:—The *Carolina Pink-root*, *Worm-seed*, *Mandrake-root*, *Stinking Hellebore*, *Cardinal-flower*, *Tobacco-seeds*, *Ground-pink*, *Male-fern*, *Pride of India*, and vegetable fixed alkali, stand on the list of vermifuge remedies. Dr. Barton prefers to give

the pink-root in powder. He notices the accusation against this medicine, "of occasioning, for a short time, a disagreeable affection of the eyes"—but without confirming or rejecting it. More serious accusations have been preferred against it; but we believe all of them are nearly foundationless. We have been accustomed to see barrels of it annually exhibited in decoction, with the greatest freedom, in certain parts of the country, without ever noticing, or hearing of any disagreeable consequence. It is certainly true of this valuable medicine, as has been previously remarked by Dr. Home, that it will often relieve the symptoms supposed to originate from worms, even when no worms are discharged. Perhaps its use might be advantageously extended to other complaints.

In a new edition of this Essay, which we hope may speedily be called for, it would be desirable to see a more particular account of the *Melia Azedarach*, or Pride of India, a medicine which deserves the most extensive circulation in the United States. This *tree*, (for it can scarcely, except in a scientific point of view, be called a plant), which is pretty large and very beautiful, abounds in the State of Georgia, and forms one of the chief ornaments, and protections against the extreme heat, of the city of Savannah. Its bark is in general use among the Georgia planters, as a vermifuge; and though, like all other anthelmintic medicines, it sometimes fails, we have the best authority for adding, that it is often successful after the most powerful remedies of this class, in common use, have been exhibited in vain.

Concluding the scientific part of his Essay, with the consideration of anthelmintic medicines, Professor Barton makes an enthusiastic and eloquent eulogium upon the application of Botany to the improvement of the Materia Medica. May it stimulate and inspirit the youth of our country to undertakings which shall leave no field of natural science unexplored!

We here take leave, with regret, of this short but interesting publication, in our notice of which we have been the more copious, as we wish to further, by our best endeavours, the benevolent purposes of the author. And we ardently desire that this Essay may prove a nucleus to which accretions of similar information may constantly be taking place; and a germ, which, under the industrious and learned care of Professor Barton, may, ere long, expand into fragrance and beauty, and ripen into imperishable and delicious fruit.

Some additional illustrations are annexed, in an Appendix to the Essay; and, as noticed in our last No. some strictures are promised on the classification of Dr. Darwin, which we shall be glad to see. For the subject, even yet, requires much to be done.

ART. III. *Observations on the Causes and Cure of Remitting Bilious Fevers. To which is annexed an Abstract of the Opinions and Practice of different Authors; and an Appendix, exhibiting Facts and Reflections relative to the Synochus Ictéroides, or Yellow Fever.* By *William Currie*, Fellow of the College of Physicians of Philadelphia, &c. Philadelphia. *Palmer*. 1798. 8vo. pp. 227.

THIS is the work whose publication was announced in our last number.—The nature of his work, and the design of the author, are set forth, in his Introduction, in these terms:

"The following *Production* (the result of much reading, reflection, and considerable experience) contains observations on the "situations, climates, and seasons, in which *Remitting* or *Bilious* "*Fevers* are most prevalent; the causes from whence they originate; the circumstances which render them epidemic; remarks "on Sydenham's doctrine of the influence of constitutions or "conditions of the atmosphere; an examination of the question, "whether Intermittents or Remittents are contagious or not; and "a comparison of their distinguishing symptoms with those of the "Contagious Fever, commonly called the Yellow Fever, which "has occasioned so much mortality and distress, in different sea-"port towns of the United States of America, since the year "1793. With a description of the Remitting Fever, as it appears "in Philadelphia; and the method of treatment which the author "has experienced to be most successful.

"An Abstract is also annexed of the opinions and observations "of almost all the physicians that have practised in different ages "and in different climates, which have come to the author's know-"lege, that he thinks worthy of notice; the object of which is, "to furnish those at a distance from public libraries with a com-"pendious and connected view of every thing interesting that has "been published, and that lies scattered in a multitude of volumes "on the subject; free from the perversions of fallacious and mis-"leading theory, or the misrepresentations of uncharitable and "distorting party-spirit."

This ample account of the publication before us, together with the very general information of the author's particular opinions, derived from his former publications, leave us little more to do, at present, than to examine into the additional facts and reasonings by which these opinions are meant to be illustrated and confirmed. To enter into minute discussions relative to the numerous points in which we have the fortune to dissent from Dr. Currie, is incompatible with the limits prescribed to a review. On some of the more important topics, however, we shall venture to enlarge.

Under the title of *Observations on Bilious Fevers*, the author, after

defining the term Bilious Fever, proceeds to enumerate various countries and situations, in different parts of the world, which are subject to this disease: which, he very justly remarks, "is amazingly influenced in *its* aspect and symptoms, by the soil, situation, climate, season, and by the preceding and present qualities of the atmosphere, and the customary mode of living of the inhabitants." The application of this remark might have been extended much farther than Dr. Currie has chosen to apply it; and have been successfully employed to the removal of many of the objections which are adduced, by him, to the reasonings of other writers, in various parts of his work. It might have further saved him from an incorrectness in stating the opinions of the physicians in Philadelphia and New-York; and, in connection with the uniform testimony of facts, satisfied him, that though the contagious or pestilential quality of fevers may depend neither on *very dry* nor *very wet* seasons, yet that, with few exceptions, no extraordinary season, of whatever kind, has passed without exercising some unfriendly influence on the health of mankind, and favouring the generation and spread of epidemic diseases. A profound consideration of the force of this remark might also have led to some hesitation in deciding on the doctrine of the illustrious Sydenham. The opinion of this great physician, that when the small-pox or plague prevailed, "they either banished all other diseases, or compelled them to wear their livery"—that is, they assumed their "type and leading symptoms, and required the same "treatment"—is declared to be "*totally incompatible with facts and later observations.*" Several instances are quoted to prove, "that two contagious diseases, different in kind, may prevail in the same place, at the same time." The reader will observe that the doctrine of Sydenham is not very correctly exhibited by Dr. Currie;—but, admitting the authenticity of his facts, they can scarcely authorize the strong condemnation of Sydenham's opinion. On the contrary, some of the cases adduced to disprove, actually confirm it. The English Hippocrates admits the co-existence of two diseases in the same place. His remark is merely that the one was compelled by the other to wear its livery. And this, so far from "being incompatible with facts and later observations," daily receives additional confirmation, and is established by the very authorities quoted by Dr. Currie. Thus, in New-Haven, in 1794, the grand epidemic was the *Scarlatina;* and Dr. Munson says, that the Yellow Fever, which afterwards appeared there, "partook of the nature of the epidemic then existing," by not bearing the lancet. The Letter of the Rev. Mr. Backus, published in our No. IV. furnishes a striking fact to the same end; and the accuracy of Dr. Sydenham's observations is supported, by every writer of credit, from Thucydides to Dr. Rush. Many er-

rors, no doubt, have been mingled with the discussions of this topic, in consequence of the mistaken notions which have prevailed among medical writers, particularly since the time of Mead, relative to contagion. But the leading principle is unquestionably well founded; and if we do not enter into an ampler consideration of the subject at present, it is from an expectation of being soon called to the examination of a work abundant in its details and illustrations.

After some brief remarks on the "causes of Bilious Fevers," and on the diffusion of "Febrile Miasmata through the air," which require no particular notice, Dr. Currie enters into a discussion of these two interesting questions:

"1. Is the Bilious Fever, or any other variety of the Remitting "Fever, occasioned by Marsh-miasmata, or the exhalations from "putrid or putrefying vegetables, ever contagious?

"2. And was the Yellow Fever, which occasioned such deplora-"ble mortality in Philadelphia, in the summer of 1793, and which "has appeared in other sea-port towns in the United States of "America since that period, only a higher grade of the Bilious "Fever, generated by the same causes?"

The negative of both these questions is asserted.

In the present imperfect state of our knowlege concerning contagion, it may be deemed too bold peremptorily to decide that Remitting Fevers are never contagious; but, we have no hesitation ourselves in confessing this to be our opinion. Perhaps, however, the great difficulty in the way of obtaining correct notions on this point, arises from the indistinct and various use of the term contagion; and we regret that Dr. Currie has not rather defended his side of the argument by a philosophical inquiry into the nature of contagion, its laws of operation, and its generation, than by a series of objections, not always ingenuously urged, to the testimony of other writers. Could it be proved (as we think it may), that, from the uniform laws of the immediate cause of pestilential fever, or of fevers in general, no such fact as their propagation by any poisonous material, separated from the body, can happen, this would completely overthrow all the arguments derived from the supposed occurrences of such facts. But, till this is done, or till direct proof is brought of the inaccuracy of any particular writer, that writer's evidence must be admitted as valid against any mere conjecture of another, who had neither opportunities to observe, nor grounds for distrust. Thus the general observations of Dr. Lind cannot be allowed as of sufficient force to set aside the testimony of Dr. Rogers, respecting the fever in Wadham College; because it is more likely that Dr. Lind's opinion is erroneous, than that Dr. Rogers, who was an eye-witness, should be mistaken. There is good reason, however, to believe,

that Dr. Rogers erred in mistaking the gradual operation of the same cause, for the effects of one which, hitherto, has never been proved to have existence. So in the passage quoted from Zimmerman, though somewhat incorrectly expressed, the opinion of that author is sufficiently plain. He unquestionably supposed that the fever occasioned by the flax was propagated by contagion—that is, by intercourse with or contact of the sick. But, though this is clear, and though there need be no doubt of the capability of putrefying flax to produce a fever in persons exposed to its exhalations, there is no sufficient evidence that the fever in question was propagated as Zimmerman supposed. In short, though we entirely agree with Dr. Currie in his conclusion, that the Remitting and Intermitting Fevers, or forms of fever, are never contagious, in the strict sense of the word, we do not think that he has given to his opinion all the support of which it is susceptible; nor, indeed, that it is capable of adequate support on the ground he has taken.

The discussion of the second question is brief, and conducted in a manner neither very lucid nor very satisfactory. Indeed, the author himself seems aware of the difficulty of the task undertaken, and acknowleges the embarrassments which beset an attempt "to "convey precisely, in words, a description of the symptoms which "distinguish the one disease (Bilious Fever) from the other (Yel-"low Fever); their discriminating marks not consisting so much "in one or two symptoms, as in a certain assemblage of several." But he adds, that "when the whole of the symptoms of each are "compared jointly and severally, the difference is exceedingly clear "and evident." In this conclusion, however, we cannot concur; neither reading, nor reflection, nor observation, having presented to our minds any sufficient reason for such a belief. And, we are persuaded, that whoever will compare Dr. Currie's own descriptions of the two diseases (as he denominates them) will find it impossible to discern any generic difference between them. That which is most insisted on, not in this place merely, but in various parts of his work, is the difference in the type, or recurrence of the remissions and exacerbations, of these fevers. But it seems to us very improper to fix on this circumstance as a criterion which, of almost all others, connected with Yellow Fever, is most liable to variation, from a thousand circumstances. And, in the milder forms of fever, we have often observed an irregularity and obscurity in the remissions and exacerbations, governed by no apparent order, and reducible to none of the systematic divisions or distinctions of febrile diseases. Nor is the distinction asserted in respect to the excretion of bile more happily taken, if we may rely on the testimony of authors of high and deserved authority. Even in Philadelphia, Dr. Rush assures us, that, in the Yellow Fever of 1793, "on the first and second days of the disorder, many patients

"puked from half a pint to nearly a quart of green or yellow bile." And we have seen, not one instance only, but several, that correspond very correctly with Dr. Currie's description of Bilious Fever, as to the general turn of the symptoms, and particularly as to the type of the fever, in which no unusual quantity of bile was manifest at any period of the disease.

We forbear any further consideration of this question, till we have opportunity to examine the author's intended publication on Yellow Fever, as contradistinguished from Bilious Fever; in which we are led to expect a more copious history of the origin and causes of the first-named disease.

The discussion of the two preceding subjects is followed by "A Description of the Bilious Remitting Fever, as it usually ap-"pears in Philadelphia, in summer and autumn," drawn up with equal perspicuity and precision; and well deserving to be read attentively by the student. The remarks on the predisponent causes, prognosis, and on the weather, are also deserving of attention. Dr. Currie's plan of cure consists in removing the patient to a dry situation and pure air, after the removal of the remote causes of the disease; and in procuring such an intermission of the symptoms as shall admit of the administration of the peruvian bark. To this end, bleeding is recommended; an operation which our author has sometimes found it requisite to repeat, (to the taking away of ten or twelve ounces a day), every day, to a fifth time; and, in a few cases, he has opened a vein twice a day. Calomel is particularly recommended, upon the authority of Drs. Balfour, Clark, Wade, and Chisholm, &c. as a purgative; and, joined with opium, to take off the irritability of the stomach. Sweating, by means of antimonials, to assist in procuring an intermission; and the cold bath, upon the credit of Dr. R. Jackson, when the stomach rejects the bark—which the author advises to be given by injection into the bowels as well as by the mouth. To reduce the dropsical swellings which sometimes succeed, ten or fifteen grains of pearl-ash, two or three times a day, in a bitter draught, are directed; in more troublesome cases, the digitalis, squills alternated with chalybeates, mercurial frictions, &c. &c. with a variety of treatment accommodated to particular symptoms, and the various stages of convalescence, for which the work itself may be profitably consulted.

The next and principal part of Dr. Currie's publication consists of "An Abstract of the Opinions and Practice, in Febrile "Diseases, of Physicians of different Countries, &c. with Occa-"sional Remarks," preceded by Dr. Buel's account of the Sheffield fevers of 1793, 1794, and 1795, (from Webster's Collection), and two letters to the author, from Dr. Johnson, of Talbot County, Pennsylvania, and Drs. Taylor and Hansford, of Norfolk—ex-

tending, in the whole, from the 79th to the 206th page, inclusive. In this Abstract, after a hasty sketch of the opinions and practice of several of the ancient, and of the earlier modern physicians, the author proceeds to display, in their own words, generally, those of Hoffman, Pringle, Cleghorn, Huxham, Morgagni, Tissot, De Monchy, Lind, Badenoch, Rush, Baker, Cullen, Blane, Moseley, R. Jackson, G. Fordyce, Paterson, and Wade, at various length: and the conclusion which he derives from this copious survey of the writings of others is, "that the Remitting or Bilious "Fever, as it is commonly called, is only a variety of the Intermit-"ting Fever, occasioned by an invisible matter (known to exist "only from its effects) derived from dead animal and vegetable "matter, in a state of putrefaction; that it is distinguished by an "evident remission or abatement, but not a total suspension or "cessation of all the febrile symptoms once in the course of every "twenty-four hours, most commonly in the morning, and a re-"newal and increase of the same before the evening; differing in "this, as well as other circumstances, from the Typhus, or Con-"tinued Fever, occasioned by human contagion, in which there "is almost always an exacerbation or increase of the fever later "in the evening: that the nearer it approaches to or resembles the "intermitting type, the greater is the prospect of safety: that the "paroxysms are prolonged, and intermissions prevented, or ren-"dered imperfect, by two opposite circumstances—viz. by a *phlo-"gistic* diathesis, and by preternatural *depression of strength:* that "this kind of fever is not contagious, or communicated from one "person to another: and that it differs from the Malignant Yellow "Fever, not only in that respect, but in its causes, nature, and "symptoms, as well as in the remedies requisite for its cure." And, finally, "that no general or infallible rule can be established "with regard to blood-letting in Remitting Fevers, derived from "Marsh-miasmata." Indeed, it is observable, that of all the late writers, quoted by Dr. Currie, Dr. Moseley is the only one who decidedly recommends venæsection. From this decision of these writers, our author dissents, and, in our opinion, with great propriety. For nothing is more obvious than that, however judicious their practice may have been in the countries whose diseases they describe, no prudent physician could implicitly follow it in a climate, and under circumstances, in many respects, so different as ours, and where even a few years has very considerably varied the aspect of febrile diseases. This last fact should not have been so entirely overlooked by Dr. Currie. Its right consideration would have sufficiently explained to him with how much propriety Dr. Rush might adopt a different practice in the fevers of 1780 and 1793.

A brief *Appendix* is annexed, in which Dr. Currie endeavours

to prove the uniform importation of Yellow Fever into the United States, its highly contagious character, and in which he hastily describes its symptoms and method of cure. But of this we shall not take notice at present—reserving our remarks for his general treatise.

Two short papers, on the Cholera, and on the Bilious Diarrhœa of infants, are added, which, notwithstanding some omissions, may be safely followed in the more usual forms of these complaints; and the author's Treatise of the Yellow Fever of 1793 is bound up in the same volume.

On the whole, though we cannot admit that Dr. Currie has fulfilled every promise which is held forth in his Introduction, yet we think that he has furnished to practitioners remote from books, and the liberal and extensive information of the thickly-settled parts of our country, a book which, in connection with a few other of our recent publications, may be both useful and instructive; and, if not a luminous guide in opinion, generally a safe conductor in practice.

ART. IV. *A Treatise on the Autumnal Endemial Epidemic of Tropical Climates, vulgarly called the Yellow Fever; containing its Origin, History, Nature, and Cure; together with a few Reflections on the Proximate Cause of Diseases.* By *John B. Davidge*, A.M. M.D. Baltimore. *Pechin.* 1798. 8vo. pp. 65.

THE ravages which have been made, by the Yellow Fever, in human Society, particularly within a few years, and in our own country as well as in others, have given birth to numerous publications of various degrees of ingenuity and usefulness. The longer the consideration of this disease has been continued, the more difficult the medical world appears to have become as to admitting for truth the several explications of its phenomena, and adopting as proved the efficacy of the numerous means recommended for its cure. In this situation of the public mind, a work which holds forth the promises contained in the title just quoted, can scarcely fail of being purchased with avidity and examined with attention. How far it will be thought to justify these promises, in the execution, may, perhaps, be more easy to conceive after the examination, to which we now design to subject it, is completed.

The Treatise before us, which the author has divided into four chapters, is prefaced by a short Introduction, the substance of which seems to be this: That erroneous opinions produce little effect but when assumed and recommended by men of distin-

guished reputation and acknowleged abilities; that the contagious property ascribed by some medical writers to diseases generated by marsh exhalations is an error; and that this error having been adopted and enforced as truth by so illustrious a physician as Dr. Rush, it is necessary that it be combated and exposed. From this the reader would be ready to suppose, that the principal scope of this Essay was to settle a question of medical theory; but, though a large share of it is indeed devoted to this end, yet this is by no means the single object of the writer, as will be still further apparent from the titles of his chapters, which treat—1. Of the Origin, History and Nature of the Yellow Fever; 2. Of the Proximate Cause; 3. Of the Diagnosis; and, 4. Of the Cure.

Dr. Davidge commences his first chapter with some objections to the doctrine which teaches that the Yellow Fever may be imported from one country into another. He regards it as every where the product of the same cause; and that this cause is the same with that which generates the ordinary Intermittents and Remittents, from which he supposes this disease to differ only in degree—being "conceived in the same matrix, and quickened "by the same sun." And he appears inclined to believe, that the noxious cause of these various forms of fever is Hydrogen *(Hydrogen Gas)* "very much accumulated, or peculiarly combined." We are not certain that we perfectly comprehend the author; but we think that this conjecture derives very little support from the numerous trials which have been made with this remedy, in various proportions and combinations, by the friends of Pneumatic Medicine in Great-Britain and elsewhere.

In the short History, which succeeds, of the Fever that prevailed in Baltimore the last summer and autumn, some particulars worthy of notice are recorded. It has been believed by many physicians who discard the opinion of the uniformly contagious property of the Yellow Fever, that it assumes this character when certain local causes have imparted a peculiar morbid principle to the atmosphere, or that this Fever was then liable to be excited by the union of the effluvia from a body diseased with it, with this morbid principle derived from local exhalation. But, if the whole of both these conjectures be not gratuitously or slightly assumed, they are not strengthened by what was observed at Baltimore in 1797. It appears, from Dr. Davidge's account, that the Bilious or Remitting Fever, in its ordinary form, prevailed in that Town, and particularly at the Point, from June. During its continuance, in this degree, a lady, lately from Philadelphia, sickened with the true Yellow Fever, in its worst form, and fortunately recovered, without imparting any contagion or infection to her attendants or others. On the contrary, the progress of the Baltimore fever was regular, from its original mild appearance, till it was gra-

dually lost in the severer degree of Yellow Fever, as the season advanced, and in the month of August. From this time, till early in November, when it became entirely extinct, the Yellow Fever alone was observed; and it was obviously more severe, more early in its occurrence, and more general in its prevalence, in the direction of the winds which blew over certain marshes, stagnant waters, and depositions of filth. In Baltimore, as in other places, no particular age or condition was exempt from its attacks; but it was most fatal to the young and robust.

From this brief history of the Baltimore fever of 1797, Dr. Davidge recurs to the consideration of its origin and nature; and as, in discussing this subject, he dissents, in several particulars, from the two opinions which have gained the greatest number of advocates, it may not be improper, previous to a detail of his arguments, to contrast his opinions with those of Dr. Rush and Dr. Currie, the most voluminous writers on the Yellow Fever of the United States.

Dr Rush and Dr. Davidge consider Intermittents, Remittents, and Yellow Fever, as merely varieties of one disease. Dr. Davidge supposes that they are produced by the influence of heat on putrid vegetables and stagnant water, or by the exhalations occasioned by these means; Dr. Rush, that the exhalations from putrefying animal and vegetable matter are the most usual causes, but also that a noxious material, emanating from a body sick with these fevers, is sometimes the cause. Thus the one admits that these fevers may be contagious, which the other pointedly denies.

Dr. Currie and Dr. Davidge agree in a two-fold division of fevers, into such as are the offspring of putrefactive materials, or their exhalations, which are never contagious; and such as are excited by noxious effluvia, emanating from bodies diseased with particular fevers, and which are solely propagated by contagion. In the first class Dr. Currie ranks the various forms of Intermittents and Remittents; in the last, Yellow, Typhus, Petechial, Jail and Pestilential Fevers. From this arrangement Dr. Davidge departs only by inserting the Yellow Fever in the first division.

In popular use, no distinction is made between the terms *Infection* and *Contagion;* nor, perhaps, would an etymological examination of them justify distinction. It will be convenient enough, for our present purpose, however, to assume a distinction. The reader, therefore, will, for the present, be supposed to understand by the first, *Infection*, some noxious gaseous substance, capable of exciting fever, and not emanating in that form and with that power, from a diseased body; and by the second, *Contagion*, a poisonous material, capable of exciting a peculiar disease, and emanating with that power, from a body sick with that peculiar disease. That this is a distinction, in fact, none, probably, will

deny: and these terms being understood to express the fact, it will be obvious, that wherever the materials occur and the circumstances are present, which favour the generation of infection, that there it may exist—whether it be in a marsh, in a street, a yard, a house, a hospital, or a ship. But, as infection and contagion are not the same thing, the circumstance of many persons, resident in one place, being affected with a similar disease, together, or in succession, is not, of itself, a sufficient evidence of the presence of one or the other; since this effect may be produced by the one as well as the other. Other concurrent circumstances are, therefore, to be taken into consideration, before a satisfactory judgment can be formed, whether the disease be excited by infection or contagion.

After asserting that the Yellow Fever cannot be propagated by contagion, nor excited out of the atmosphere wherein it originated, Dr. Davidge attempts to destroy the objections to this opinion, which Dr. Rush has drawn from the writings of Rogers, Zimmerman, Clark, &c. by remarking, that, in the two first cases, it does not appear that the disease prevailed beyond the limits of its first ravages; and, therefore, that we are at liberty to believe that it was continued, not by the intercommunication of sick and well, (not by contagion) but by the cause which originally excited it—(by infection). This is an important and just distinction, and is strikingly illustrated in the Essay by Dr. Buel, published in our No. IV.—Our author is not equally happy in his objection to the argument derived from Dr. Clark. Where was the necessity of embarrassing himself with conjectures as to the possible exposure of a ship's crew to marsh effluvia? If putrefying vegetables and stagnant water can generate a pestilential material in marshes, surely, by the aid of the same heat, they can produce the same material in ships. And will any one deny that they are not often to be found in ships? But this material, this gas or exhalation, though it should affect the whole crew with fever, could not be denominated contagion. The facts recorded by Dr. Clark, therefore, do by no means establish the contagious character of fevers.

Our author proceeds to reprobate the doctrine of the contagious character of diseases arising from marsh effluvia, &c. and of Yellow Fever, as one of this description, as unphilosophical; and, after quoting the opinion of several respectable writers which are in his favour, remarks, that "endemic is the antithesis of contagious." He asserts that both endemic and contagious diseases may be epidemic; and that the extent of their prevalence, not their peculiar origin, determines their claim to this title; and he maintains, that when a disease is incapable of propagating itself, independent of the adventitious assistance of a peculiar purity or impurity of the atmosphere, it cannot properly be called contagious. This he il-

lustrates by comparing Intermittents, &c. which are only excited in situations exposed to the exhalations before noticed, with Small-pox, Measles, &c. which are communicated by contact, &c. in the purest air, and in every season.—As the author has enumerated the Jail Fever and the Plague among diseases of specific contagion, as well as Small-pox and Measles, it may be proper to inquire a little into this subject, and to examine whether there is any better ground for a distinction between these and Yellow Fever, than between this last and our ordinary Remittents.

An attentive examination of the facts relative to those diseases —we will, for the present, call them epidemics—which have received the name of Plague, and Jail Fever, will shew that they have rarely, if ever, been propagated beyond the diseased atmosphere in which they originated, except by the operation of general causes, wholly independent of what we here mean by contagion. But, if this be the fact, there is no more reason for believing (from this circumstance) that the Plague is contagious, than there is for believing the Yellow Fever so. In Egypt, the Plague unquestionably originates in exhalations or effluvia extraneous from the body, (whether vegetable, or animal, or both,) and is governed by uniform laws, as to its commencement, progress, and disappearance. In many other parts of the world, not to say all, its origin and course are the same. It should appear, then, that this disease is capable of being excited by infection; and if by infection, then, according to Dr. Davidge's own logic, not by contagion. What is true of Plague, is also true of Jail Fever. Introduce healthy persons into the pestilential atmosphere, and they will often be made sick. But, cleanse the sick, and remove them into pure air, and they communicate no disease. That men, in high latitudes and healthy places, have been rendered sick in consequence of visiting ships that have arrived from unhealthy climates, is no proof of the contagious property of the fevers of those climates. The cause of sickness may have been generated in the ship (as was the case in the Busbridge); it may affect only the crew, and disappear; or the crew may sustain it, uninjured, by a habit gradually formed, and the first effect be felt by healthy, unhabituated persons, in the first port she visits. But this, whatever may be the form of the disease, is not contagion, it is strictly infection, and is wholly independent of any poisonous material separated from a diseased body. The same reasoning will apply to cases of supposed introduction of Plague by means of clothes; and on this subject Dr. Davidge himself reasons very properly at p. 32 of his Treatise. But, in all these cases, the sickness would be strictly limited to the persons exposed to its cause, or to the infected; and would never be propagated to others, except in circumstances hereafter to be noted: that is, the disease would be

confined to the sphere of exhalation, exactly as in the case of the marshes and stagnant pools.

Another error of our author deserves to be corrected, as its correction will go far in illustrating the remaining difficulties on this subject, and will, perhaps, dissipate the confusion which arises from his assumed distinction of fevers. This error is, that Intermittents, Remittents, and Yellow Fevers, are solely the offspring of vegetable putrefaction and stagnating water. A short attention to this point will shew the impossibility of such an occurrence. No pool, no marsh, can be found which does not abound in animals or animalculæ. The circumstances of season which expose the vegetables of these places to putrefy, equally affect their animal inhabitants; and in docks, streets, and yards, the recrements and excrements of animals are profusely scattered. Pure vegetable putrefaction, therefore, can never happen in these places. But, were it possible, do we not know that numerous vegetables contain, though in different proportions, the same elements as animals? Modern chemistry has discovered, not merely carbone, oxygen, and hydrogen, in plants, but azote. This element is particularly abundant in wheat, rye, and maize; and, by analogy, may be presumed to exist in all the grasses, legumes, cruciform plants, potatoes, &c. But these are the vegetables most abundant in marshes, and the vicinity of man. It should seem, therefore, that the putrefaction of animals and vegetables should render up to the atmosphere very similar products, and capable of exciting diseases of a very similar character. We are not yet sufficiently inducted into the mysteries of nature, to know what varieties may flow from the perpetually varying proportions in the intermixture of animal and vegetable remains.

Let us extend this survey one step further.—In what respect does the mortified flesh which sloughs off from the limb of a living man, that is separated from the mouth of one labouring under the angina maligna, or excoriated from the intestines of a dysenteric patient, differ from the putrid flesh of a dead ox, dog, or horse? In what respect do tears, saliva, and sweat, differ from other healthy, or yet disorganized animal matter? Suppose a piece of meat exposed to the action of heat, and air, and moisture, till it goes through those chemical changes which we denominate putrefaction—and suppose the perspirable matter similarly exposed, and carried through a similar process—what reason have we to believe that the result would be widely different? And, if the first should furnish a material qualified to excite fever, why not expect it from the last? If clothes were at hand to absorb the second, would they not equally absorb the first? But, in neither case could this material, thus formed without the body, and in no respect deriving its poisonous qualities from the body, be fairly

called contagion. In the last case, as in the first, and in both, as in marshes exposed, half covered, to a hot sun, the pestilential principle is a new product, independent of disease.

That the perspirable matter of men sometimes undergoes such changes, and, in consequence, sometimes excites disease, is probable. But, that the disease excited is not the consequence of any previous disease of another, is quite as clear. This is particularly observable in the so much-quoted story of the Black-Assizes. The criminals were well;—they had been well;—habit had rendered them insensible to the influence of that cause which proved so fatal to their judges. Are healthy bodies, then, capable of generating contagion?

But instances of this kind, if they sometimes happen, are rare, and produce no more extensive mischief. For in this case, as in that of Yellow Fever, or of Intermittents, the infected only sickened. They did not propagate the disease. And why not, if it were contagion? That instances of infection, from this source, are very rare, is inferred from the well-known custom of the Turks and others, of selling at vendue the clothes stripped from the poor who have just died of the Plague, which are purchased and worn, without precautions and without injury, by those who survive.—The true secret of the supposed contagious nature of these diseases, as well as of Yellow Fever, in many cases, is exposed by our author at p. 24. The debility induced on the well, by fear, watching of the sick, &c. in the diseased atmosphere, favours the operation of the pestilential cause. Hence the attendants on the sick are so much more apt to be affected in the same manner, than the well who are not thus debilitated; even if the general exposure is the same. And even this debility would be far less injurious, did not their fears continually conjure up the spectre Contagion, to walk the sick-room, and shake from his yellow mantle pestilence and death.—Contagion has long been a bugbear to physicians as well as others. The ingenious and philanthropic labours of Dr. Haygarth and his correspondents have robbed it of half its terrors—and shewn us how limited is the sphere of the contagious influence of Small-Pox—(so limited that probably we may reverse our author's calculation (p. 23) and say, that, under ordinary exposure, 49 out of 50 would *escape* it.—); may the present discussion—the length of which the importance of the subject will doubtless excuse to our readers—aid to disarm it of the remainder. We shall take leave of this part of Dr. Davidge's work, by noticing two facts which he records. 1. That Dr. Watkins, of Kentucky, (p. 26) who was present at Baltimore during their fever of 1797, declares it to resemble, in all essential characteristics, the fevers of that State; which are evidently and solely the product of the marshes, and are never contagious. 2.

That the author has observed (p. 28) two instances of persons falling sick not till the eighteenth day after exposure to an impure atmosphere—when, "during the intermediate space, they were "not exposed either to sick bodies or vegetable effluvia."

In his second chapter, which is intituled, "Proximate Cause "analyzed," the author, after a cursory review of the opinions of preceding physicians, proposes some objections to the theory of Dr. Rush—of which the reader will find an account in No. 2. of our vol. I. But these objections are rather in the form of assertion than of argument; and had he consulted the illustrious Herman Boerhaave on the Causes of Diseases, he might not have so peremptorily pronounced the hypothesis of the Professor of Philadelphia untenable and illogical.

But, if the theories of others are so faulty, are there no objections to that of Dr. Davidge? A man is long exposed to cold and wet, he becomes feeble in consequence, he enters suddenly a heated room, and soon after is seized with pain in his breast, fever, cough, and other symptoms of Catarrh or Pneumonia—How would Dr. Davidge describe this course of events in his own terms? Would he call cold, or the debility which was the consequence of cold, the Predisposing Cause? Would heat, or the violent arterial action which follows, be denominated the Occasional Cause? And is the debility or the heat to be esteemed the Exciting Cause? We suspect that our author has not yet penetrated to the hiding-place of this long-concealed mystery. Leaving it, however, to be detected by future adventurers, we pass on to the third chapter, which treats of the "Diagnosis."

In this division of his work, Dr. Davidge has enumerated the symptoms of the Yellow Fever in its various stages, but without any additional remarks that require particular comment. Some observations might be hazarded on his "Cure," had we not already exceeded our usual limits. These, however, would rather have reference to his reasonings than to his practice; which, for the most part, corresponds with that pursued by those physicians who prefer what is called the antiphlogistic plan. Our author objects to Dr. Rush's profuse bleedings; and cites, not merely his own experience, but that of the West-India practitioners, in support of his objections. But he overlooks the differences of season and situation, and the discriminations of Dr. Rush himself. Nor can we conceive that a patient would be much less debilitated by a cathartic which should operate thirty-five times, (p. 55) than by two or three small extra bleedings. But this is a question of experience on which we do not pretend to decide. In this city we have more often seen patients suffer from deficient than from excessive blood-letting.

Though it does not strictly come within the design of this re-

view to notice the style in which medical works are composed; yet, as style is inseparable from sentiment, and as the purpose of writing is to convey information clearly and completely, we have some right to complain of an author whose manner is deficient in this respect. This is oftentimes and singularly true of the Treatise before us. That this remark is not captiously made, will appear from a few quotations. Page 25. "The human effluvia esta- "blishes *(establish)* one order of diseases, and the marsh effluvia "another—these orders never embrace—they have no intercourse. "Of these identity forms the curve, and those effluvia the assymp- "totes—they apparently approximate, but they can never come "into contact." Page 27. "Which is most consonant with "probability; for gentlemen, going to an atmosphere charged "with poison and death, an atmosphere immediately wafted from "the point and concentrated under a hill, where many had been "forced, by its deathful influence, to pass the bourn of life, and "others to perceive death, with its black wings, to hover about "them, to take it from those exanimous and moribund bodies, or "this death-bringing air." Page 39. "This epoch demands "self-evident premises or proven data for the ground-work of our "inductions. Jurare in verba magistri is the motto of unthink- "ing hebetude, but a master's nod ought not to block up the ave- "nues of research." But, notwithstanding these, and many simi- lar defects, the author evinces, in this Treatise, no small portion of sagacity, learning, and reflection. Nor are we without the expectation, when the habit of composition shall have purified his style of these affectations, that he will produce something at once honourable to himself and useful to mankind.

ART. V. *An Account of the Contagious Epidemic Yellow Fever which prevailed in Philadelphia in the Summer and Autumn of* 1797; *comprizing the Questions of its Causes and Domestic Origin, Characters, Medical Treatment, and Preventives.* By *Felix Pascalis Ouvière*, M. D. &c. Philadelphia. *Snowden and M'Corkle,* 1798. 8vo. pp. 180.

THIS is the history of a distemper of which about thirteen hundred persons are reported to have died, in Philadelphia, in the year 1797. The author has published an intelligent and useful work, and the value of it is increased by the intrepid manner in which he opposes the prejudices which occupy the minds of the inhabitants of the city in which he dwells. For, notwithstanding the popular opinion to the contrary, he tells them the Yellow Fever is generated by putrid effluvia from vegetable and

animal fermentation. He states, that the opinion of its importation, one hundred years ago, from Siam to the West-India Islands, and from these Islands to North-America, cannot be admitted exclusively to its being generated spontaneously in every warm country, from the above-mentioned causes; and that the Philadelphians are exposed to such exhalations as seem adequate to its generation. The author is also of opinion, that it is not only of a highly malignant nature, but that it is contagious.

Dr. Ouvière thinks the Yellow Fever is the first and highest degree of Malignant Bilious Fever: that though there is but one sort or genus of the disorder, there are several species or degrees of malignancy in it: that it consists of two periods—the one, as he terms it, of the *Symptoms*, which lasts from one to five days—the other of the *Crises*, which always prove mortal if they appear before the third day. In cases of recovery, he observes, the fever is remittent during seven days, like the causos, or ardent fever.

The cure of the disorder, the author thinks, is comprehended within three indications. 1. To evacuate corrupted and acrid bile: 2. To counteract the progress of inflammation: 3. To assist the depuratory crisis of the whole system. To fulfil the first, he recommends calomel, particularly when united with other drastics—and an antimonial emetic: though he says the inflammatory symptoms must be considerably overcome before these remedies can be efficaciously administered. To accomplish this second indication, profuse and repeated bleedings are recommended, as the only sure means of abating the inflammation, especially within the first three days, during which, not to take enough would be fatal. The bleeding and purging being attended to during the three days, the last indication is to be answered by putting in practice all the medical rules for the treatment of malignant fevers, &c. Dr. Ouvière observes, though mercurial drastics are so eminently serviceable when acting upon the bowels, that the external application of mercury is useless and dangerous; and that previous complaints in the liver, in the bladder, and in the urinary passages, as well as scorbutic and venereal affections, are, without exception, obstacles to the cure of the Yellow Fever.

The fifth section of this work, on the means of *general* prevention, we recommend to the citizens of Philadelphia, who are incessantly looking abroad for sources of imported contagion. Domestic and local causes enough are there pointed out to satisfy every unprejudiced and candid mind. The Police and Health-Office ought to study this part of Dr. Ouvière's book, and attend to its plain and instructive directions; to bury the dead out of town—to introduce pure and running water, by aqueducts, from a distance—to have wharves constructed of stone instead of wood

—to clear out and cleanse privies and their pits annually, and to throw lime into them—to put the gutters, sinks, cellars, &c. under the direction of commissioners during the summer and autumn—and to cause vessels with suspected cargoes and holds to be unloaded at a distance from the city, and to undergo, if necessary, a quarantine of five days. And, in addition to this section, we recommend to our fellow-citizens, in the sea-ports of the American continent, a perusal of the coercive and energetic mode, provided by the Legislature of New-York, for the preservation of their capital, contained in the first, second and third sections of the act to provide against infectious and pestilential diseases, passed 30th of March, 1798.

As to *particular* prevention, Dr. Ouvière advises vegetable diet, light nourishment, and antiphlogistic and depleting remedies; as also refreshing exercise in the morning or evening, recreations, and freedom from hard labour. He advises carefully to avoid intercourse with infected people and their houses. What applies to people in general, applies, with greater force, to those who attend the sick. Infected beds and clothes are to be destroyed, or kept in cold water, covered over with ashes.

For the sake of practical illustration, the author has next given the details of symptoms and practice in twelve cases of the disease he describes. Some of these were of fatal termination, and others of recovery to health. Dr. Ouvière appears to have related the instances of successful and unsuccessful treatment, and to have commented on them, with great candour. We wish this disposition of mind was more prevalent among the writers of observations; and that the readers of this piece would well consider the pertinent and well-timed remarks contained in the concluding address. To this work there is subjoined a short postcript, containing speculations on the condition of the liver and the bile in Yellow Fever, on the Brunonian doctrine, and on the dispute in the city where the author lives, concerning the importation of the disease under consideration. We shall not, however, dwell upon these, but refer such of our readers as are curious to become acquainted with Dr. Ouviere's opinions, to the work itself.

It is our wish to treat every publication which we review with candour, and its author with delicacy. The dissatisfaction expressed by the writer of the present piece, in his expostulatory letter, inserted under the article of "Correspondence," in our vol. I. No. 4. at the sentiments we gave upon his former publication, has induced us to offer rather an abstract than a review of the treatise before us. Dr. Ouvière has been kind enough to inform us (Case No. xii. p. 163) that he is "of a bilious choleric "temperament, and irritable nerves." As we have no disposi-

tion to move his choler, nor irritate his nerves, we entertain a belief that we have conducted this account of a work, in every point of view more respectable than the former, in such a way that the author shall have no cause to be displeased with us.

Art. VI. *An Inaugural Dissertation on the Production of Animal Heat; read and defended at a Public Examination, held by the Medical Professors, &c. of Harvard College, for the Degree of Bachelor of Medicine, July* 10, 1797. By *Lyman Spalding*. Walpole (New-Hampshire.) *Carlisle, jun.* 1797. 8vo. pp. 30.

AFTER some introductory remarks, Mr. Spalding opens his subject by mentioning the two great hypotheses concerning animal heat, which have been advocated by philosophical men; the *chemical* and the *mechanical*, or, as he expresses them, the processes of *combination* and *decomposition*, and that of *friction*. Of these he adopts the former.

In exhibiting a view of the manner in which respiration is performed, the author shews himself well informed of the modern experiments and opinions on the subject. The ordinary state of the atmosphere—the alterations made in a portion of it during inspiration—the differences between venous and arterious blood—and the manner in which the vital fluid receives its caloric, according to the latest experiments, seem to be well understood by him. In inaugural essays, the writer is supposed to acquit himself well if he escapes blame, but the merit of Mr. Spalding's Dissertation does not rest here. The manner in which he has mentioned septon (azote) as an ingredient in the blood and in the atmosphere, deserves particular notice.

"The venous blood," says he, (p. 16) "when brought to the "lungs, is of a dark modena-red, which is produced by the pre- "sence of a large quantity of hydrogene or *azote*, and by the ab- "sence of oxygene." "Blood attracts hydrogene and *azote*," &c. &c. (p. 17.) "*Azote* arises mostly from putrefying ani- "mal matters, is very noxious to animals and flame," &c. (p. 19.) These ideas are worthy of attention. Physiologists, if we recollect right, have generally ascribed the peculiarities of the venous blood to a defect of oxygene, and a surplusage of carbone and hydrogene. But certainly this explanation is defective. Septon enters more or less into the food of most animals. After concoction in the stomach, a portion of it enters the sanguiferous vessels, and circulates as an ingredient in the mass of blood. The analysis of blood shews this. By the function of nutrition, as much septon as is necessary passes off to supply the muscles with

their proportion of this material. The analysis of sweat, perspirable matter, and urine, shews that parcels of it pass off with these secreted fluids; and, doubtless, the same obtains in several others. The residue, not excerned from the body, remains chiefly in the blood and solids, and if in due proportion, doubtless contributes to their natural wholesomeness. If there be too little or too much, both the defect and excess of septon may be a cause of disease. In the former case, sometimes giving rise to morbid tenuity and exility of fibre, which, though connected with debility, is still often very tenacious of life; in the latter, manifesting, to all outward appearance, tokens of well-strung and vigorous stamina, which, at the same time, have so little of vital coherence, that they are almost ready to drop to pieces, as in some cases of pestilence and scurvy.

The symptoms incidental to an excess of septon in the blood, muscles, and other parts of the human body, are highly worthy of most attentive observation. Its morbid accumulation ought to be noticed with care in all the species of domestic animals. And the signs of too great a collection of it, in sundry kinds of vegetables, ought to be diligently watched. In these ways a vast body of knowledge, interesting by its novelty and its application to theoretical and practical utility, may be amassed.

A large proportion of animals live in a fluid of which three fourths are septous (azotic) gas. Mr. Spalding thinks this is *absorbed* (he probably means *attracted)* in the capillaries, (p. 18 and 23.) and thus enters the blood. This may be the case, but we know of no experiments to prove it. We should rather suppose the septon received through the digestive organs, passed off through the exhalant vessels, and afterwards assumed the form of azotic air; and we think there are facts to convince us of the reality of such a process. But that this matter might be clearly ascertained, we wish the experiments on the changes which air undergoes by respiration to be repeated by some exact hand.

A few observations on the septic (azotic) condition of the solids and fluids in PUTRID FEVERS, conclude this handsome, though short Dissertation.

ART. VII. *Proofs of the Origin of the Yellow Fever, in Philadelphia and Kensington, in the Year* 1797, *from Domestic Exhalation; and from the foul Air of the Snow Navigation, from Marseilles; and from that of the Ship Huldah, from Hamburgh; in two Letters, addressed to the Governor of the Commonwealth of Pennsylvania. By the Academy of Medicine of Philadelphia.* Philadelphia. *Bradfords.* 1798. 8vo. pp. 49.

TWO important parts of this publication, viz. the letter from Dr. Rush and his associates to Governor Mifflin, and the memorial of the College of Physicians of Philadelphia to the Legislature of Pennsylvania, have already appeared in the Medical Repository; (see vol. i. p. 405.) which it will be sufficient merely to recall to the consideration of the reader.

The memorial of the College, together with their narrative of facts relative to the origin and progress of the Yellow Fever, is followed by another letter from the above-mentioned gentlemen, organized into the Academy of Medicine, to the Governor, in which they oppose the opinions contained in the memorial, and the statement of facts exhibited by the College.

Great force, both of testimony and reasoning, is adduced by the Academy, in combating the opinions and allegations of the College. We agree with the Academy in supposing that the quantity of filth and putrefaction in and about the city, and the foul air issuing from the holds of the snow Navigation and the ship Huldah, are sufficient to account for all the phenomena, without the intervention of foreign contagion. And, when facts shall be more minutely scrutinized, we think it probable that the importers and non-importers of febrile infection will find ground of compromise, as to a considerable portion of miasma, in the noxious exhalations from the holds of ships; as we are acquainted with no sources where miasma would be more likely to originate than in the close, unventilated holds of vessels, loaded with perishable articles, after long voyages, and thrown open to an heated atmosphere.

The Academy remark, "that many recent facts and observa-"tions render it probable, that the reports of the contagious na-"ture of the Yellow Fever have been exaggerated, and that "it is not so often propagated by contagion as has been suppos-"ed." The whole series of facts alledged by the Academy appears to us to militate against the contagious quality so strenuously contended for; and we hope this concession, corroborated by the decided assertion of the College, "that a malignant remittent fever "has never, to their knowledge, been contagious in this climate," will speedily reduce the doctrine of contagion within narrower, more just, and more definite limits.

ART. VIII. *An Inaugural Dissertation, shewing in what Manner Pestilential Vapours acquire their Acid Quality, and how this is neutralized and destroyed by Alkalis, &c. &c.* By *Adolph C. Lent*, Citizen of the State of New-York. *T. and J. Swords.* 1798. 8vo. pp. 54.

THIS piece is a continuation of the DOCTRINE OF SEPTON, started by the Professor of Chemistry in the College of New-York; of which we gave some account in our first volume, No. II. p. 236, in the sixth article of our review. Under our head of foreign news, in p. 262, of the same volume, our readers will recollect we announced that several writers in Germany had adopted Dr. Mitchill's principle, and had applied it to explain the distempers of domestic animals. We have since seen, in the *Bibliothéque Britannique* (No. XVIII. and XIX.) of Geneva, a long review and discussion of the subject in that part of Switzerland. And more recently still, we observe it mentioned with respect by Dr. Trotter, physician to lord Howe's fleet, in that part of his valuable work entitled Medicina Nautica, which treats of contagion, and the method of subduing it (p. 246.) The reception, in England, of the doctrine advocated in this Dissertation, has apparently been more cold and neglectful, by reason of its direct repugnancy to the practice of fumigating *with nitrous acid vapour to destroy infection*, and the *swallowing nitric acid to overcome venereal virus*, which had, of late, pre-occupied the minds of men of philosophical speculation and experiment in Great-Britain, and which still appears to bias the judgment of the sensible conductors of the Monthly Review, as we judge, by the drift of their objections to the principle maintained in the *Dissertation on Dysentery*, reviewed by them in p. 553, of their 23d vol. for 1797. From all we can collect, the question of contagion, and the mode of destroying it by nitrous acid and its vapour, is now in full discussion among the English; their efficacy being positively maintained by some, and as roundly denied by others. In this state of things it would be needless in us to anticipate events. Truth never fails to gain ground by fair experiments; and we leave it to experiments, to convince the advocates of acid fumigations, &c. that they are wrong.

Mr. Lent, in the Dissertation before us, pursuing the same train of thinking that had been adopted by his predecessors, *Saltonstall* and *Bay*, considers septon the basis of pestilential fluids, and oxygene the ingredient which gives it activity; and, of course, these fluids, in their most active state, being *acids*, they are most effectually to be restrained and quelled by *alkalis*.

As the author frequently refers to the pieces written by Dr.

Mitchill, whose doctrine he has avowedly espoused; and as these pieces, published from time to time, have never been collected into a volume, we shall lay before our readers a list of such of them as we recollect, in the order of their publication. And we we do this the rather, as we observe few of them have been much read, either in America or Europe. It may serve as an index for those who are curious enough to investigate the subject to the bottom.

1. Remarks on the gaseous oxyd of azote, in which the principle is stated, and the Nomenclature reformed; published during the plague of 1795, in New-York, and since re-printed in the Appendix to one of Dr. Beddoes's Volumes on Factitious Airs.

2. Letter to Dr. E. Miller, January 20, 1796; containing an application of the principle to explain how the *materials of human habitations* are affected.

3. Letter to John Stevens, Esq. February 16, 1796; on the manner in which pestilential fluids operate upon *water*.

4. Letter to Mr. Chancellor Livingston, February 23, 1796; on the decomposition of pestilential fluids by *vegetation*. These three were read before the Agricultural Society of New-York.

5. A theory of fever, contained in the last chapter of Saltonstall's dissertation on septon, published in May, 1796.

6. Letter to Simeon De Witt, Esq. June 14, 1796; on the operation of septic fluids on the human body, particularly as influencing *the types and crises of fevers*.

7. Letter to Dr. L. Valentin, June 20, 1796; application of the principle to meteorology, and deducing therefrom a *theory of hail*.

8. Letter to J. N. Havens, Esq. August 1, 1796; on their operation upon the *blood, blood-vessels and hearts of living animals*.

9. Letter to Professor Maclean, August 16, 1796; an examination of the experiments made, in France and England, to *destroy contagion by fumigation with marine and nitrous acids*.

10. Letter to Professor Hope, October 10, 1796; application of the doctrine to explain *certain diseases of the teeth and bones*.

11. Letter to H. Muhlenberg, D. D. October 24, 1796; on *septon as a manure*, intended as a supplement to Mr. Kirwan's pamphlet on manures.

12. Letter to Sir John Sinclair, November 28, 1796; on the *affinities and relations* of *septic fluids to various other bodies*.

13. Letter to Dr. Percival, January 17, 1797; application of the *principle to the Materia Medica*, particularly as respects alkaline and neutral salts. These may be found in Swords's New-York Magazine, for July, August, October, November, and December, 1796, and for January, February, and April, 1797. We purpose to insert them occasionally in the appendix of our Repository.

14. The case of the manufacturers of soap and candles, in the city of New-York, stated and examined; wherein the relations of *septic fluids to oil, soap, lime, pot-ash, and soda*, are particularly inquired into. A pamphlet published in May, 1797.

15. Remarks on manures, shewing the connection between farming and physic, and containing a *theory of the operation of gypsum.* Intended as a sequel to Peters's publication on that substance, July 1, 1797.

16. Letter to Dr. Beddoes, September 15, 1797; on the operation of *alkalies* and *lime*. To be found in the first and second numbers of the first volume of the Medical Repository.

17. Letter to Dr. Haworth, 1797; containing a sketch of medical geography, on *the exemption of tracts of country underlaid with calcareous earth from pestilential distempers*. Printed in the present number.

18. Letter to Miss ———, November 10, 1797; contrasting the method of preventing infection, &c. by *prudent housewives*, with that practised by *modern philosophers*, in Swords's Magazine for December, 1797.

19. A summary of the doctrine, printed in Mr. Webster's Collection of Papers, on bilious fevers, prevalent in the United States, Article VII.

Although we find few new ideas advanced in this dissertation, yet the experiments of Mr. Eaglefield Smith, quoted in p. 20, and printed in the Appendix, shew the highly noxious effect of *nitrous acid*, when applied to the naked nerves and muscular fibres. In this respect, resembling the poisons of serpents, and various other venomous fluids; which, though deleterious and deadly when infused in *bleeding wounds*, are capable of being taken into *the stomach* in considerable quantities, without inconvenience. This is a point of view, in which the whole of pestilential and other poisons ought to be considered.

We perceive, however, that Mr. Lent has acquitted himself in this dissertation, with industry. His method and arrangement give perspicuity to the subject. The performance may, therefore, be considered as a compendium of that part of the subject on which he has undertaken to treat, and as such we recommend it to those who are desirous of becoming acquainted with the very interesting and important doctrine which he supports.

ART. IX. *A Treatise on the Scarlatina Anginosa and Dysentery; and Sketches on Febrile Spasm, as produced by Phlogiston.* By *Israel Allen*, M. D. Leominster, (Massachusetts). *Prentiss.* 1796. 8vo. pp. 60.

THE apology offered by the author for this publication is, that the medical art may be improved by the practical observations of physicians; and that, in publishing his pamphlet, he had complied with a request of the Medical Society of Massachusetts, to all practitioners of physic, to make observations on epidemic distempers.

On this subject, we learn from Mr. Allen, that in the years 1795 and 1796, a series of endemics, or epidemics as they are called, prevailed in the town where he resides, and that these were, *chicken-pox*, *whooping-cough*, *scarlatina anginosa*, and *dysentery*. This may be considered as the most important observation in the whole treatise, and one which exhibits very strikingly, the analogy there is between all these forms of disease, designated by such different names. In the progress of inquiry, it will probably be found, that these epidemics are the offspring of one general cause, modified by age, season, sex, part of the body which it invades, and a multitude of other circumstances.

Another remark of the author, which we think worthy of note, is, "that he never could be satisfied whether it (scarlatina angi-"nosa) was contagious or not. At one time, when it entered a "family, one would have it; at another, two; at another, all. At "one time, it appeared to follow in a week or less after being "exposed; and at another, not till after four or five; and many "had it without ever being in any way near an infected person." The infectious quality is, therefore, in all probability, not greater than in Yellow Fever; which, except in the air of a contaminated place, seems not to be infectious at all.

Mr. Allen observes, in p. 15, that out of one hundred and fifty persons who had had the distemper, a large proportion were children, and of this number eight died.

The following description strongly indicates the state of the fluids in some of the worst forms of scarlatina anginosa, "an acri-"monious saliva discharges from the mouth, an acrid mucus from "the nose, very eroding to the skin, and a sanies from the ears; "the face, hands and feet are bloated; the tonsillar and parotid "glands, tumid, &c." These symptoms may possibly have some similitude to the salivation, tumid limbs, and other symptoms of some forms of sea-scurvy. And it may deserve the curious attention of some philosophical inquirer, to compare the salivation which occurs in these diseases and others, (as the small-pox, &c.) with

that which is known to be excited by mercurials and certain acids, and which has been asserted to follow the exhibition of various other articles of the Materia Medica.

In his method of cure, Mr. Allen appears to be a vigilant and careful attendant of the sick. The directions and prescriptions seem generally well advised; though the administration of tobacco to remove obstinate spasm, has somewhat dubious in it. Yet as the author recommends it upon respectable authority, we shall give the recipe in his own words: "Take tobacco, senna, and "anise-seeds, of each two ounces; boil them in water to the con- "sistence of molasses: add cathartic species sufficient to bring it "to a consistence for pills: as scammony, coloquintida, aloes, and "rhubarb, equal parts. Two pills, of common size, were gene- "rally sufficient to ease the pain and operate as a gentle and safe "purge, in an hour, or, at least, in the usual period." Our practical readers may try the formula, if they like it.

Passing from scarlatina to dysentery, Mr. Allen, without hesitation, assigns a cause of the disease. This we shall quote, that our readers may have a specimen of his philosophical acumen. "The cause of this fever (dysentery) is a precipitation of the fixed "air, from an excess of phlogiston in the surrounding atmosphere. "The heat being particularly exerted on the intestines, produces "an increased exhalation and discharge, and an immediate ten- "dency to mortification, especially in young children." And this we suppose will be sufficient.

As to what remains of this pamphlet, the *medical sketches* on heat and phlogiston, as agents in producing spasm, contain nothing interesting enough to detain our readers, or to induce us to enlarge the present article.

METEOROLOGICAL OBSERVATIONS *for April*, 1798, *made by* GARDINER BAKER, *in the Cupola of the Exchange, in the City of* New-York.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	55	67	S	S W	1	1	29 57	29 55
2	44	42	N E	N E		2	29 60	29 58
3	37	37	N E	N E		2	29 64	29 75
4	36	39	N E	N E		2	29 91	29 97
5	38	53	N E	N E	1	1	29 98	29 95
6	40	60	N E	N E	2		29 93	29 93
7	39	53	N E	N E	1	1	29 87	29 80
8	55	63	N W	N W	1	1	29 75	29 73
9	44	55	S E	S E	2		29 82	29 82
10	42	55	E	S E	1	1	29 73	29 62
11	53	51	E	S E		2	29 32	29 14
12	43	48	S W	S E		2	29 5	29
13	42	52	S E	S E	1	1	29 18	29 10
14	44	51	W	S W	1	1	29 7	29 3
15	35	48	W	W	2		29 23	29 31
16	34	41	N W	N W	1	1	29 45	29 42
17	26	36	N W	N W	2		29 50	29 52
18	36	52	N W	N W	2		29 72	29 90
19	40	51	W	S E	2		29 89	29 87
20	42	50	E	E	1	1	29 83	29 68
21	54	62	S	S	1	1	29 51	29 45
22	52	62	S W	W	2		29 40	29 42
23	49	61	S E	S W		2	29 51	29 25
24	46	61	N W	S	2		29 71	29 80
25	47	57	S	S	2		30	30 6
26	50	60	S	S E		2	29 93	29 88
27	50	67	E	S E	2		29 83	29 76
28	52	66	E	S E	2		29 85	29 80
29	55	69	S	S	2		29 89	29 90
30	55	67	S E	S E	2		29 90	29 84

Results of Meteorological Observations for April, 1798.

Mean temperature of the Thermometer at sun-rise, deg. 44 5 hund.
Do. do. of the do. at 2 P. M. 54 5
Do. do. of the do. for the whole month, 49 5
Greatest monthly range between the 17th and 29th, 45 0
Do. do. in 24 hours, between 17th and 18th, 26 0
Eight days it rained, and a very large quantity has fallen.
One day it snowed, and two inches have fallen.
Coldest day the 17th. Warmest day the 29th.

METEOROLOGICAL OBSERVATIONS *for May*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	58	76	S	S	2	.	29 73	29 63
2	59	66	S	S	1	1	29 60	29 56
3	54	71	S W	S	2		29 63	29 59
4	62	69	S	S	1	1	29 57	29 47
5	62	79	S	S W	2		29 33	29 20
6	61	72	S W	N W	1	1	29 20	29 15
7	55	69	W	W	2		29 36	29 33
8	53	67	N W	N W	2		29 50	29 51
9	55	73	W	W	2		29 50	29 43
10	53	62	W	S	1	1	29 58	29 59
11	50	55	N	N	1	1	29 43	29 48
12	46	61	N	E	2		29 60	29 64
13	49	62	N E	N E		2	29 70	29 70
14	52	59	N E	E		2	29 71	29 70
15	51	67	N	E	1	1	29 63	29 51
16	55	69	E	N	2		29 57	29 60
17	52	67	W	S	2		29 70	29 60
18	60	67	N	N	2		29 70	29 87
19	51	66	E	S	2		30 13	30 17
20	54	70	S W	S	2		30 17	30 15
21	56	69	S W	S	2		30 10	30 7
22	60	77	S W	S W	2		30	29 88
23	64	76	S W	S W		2	29 80	29 70
24	62	73	N	S	2		29 74	29 71
25	64	64	S	S		2	29 50	29 36
26	54	64	N W	N W	2		29 65	29 76
27	53	63	N E	S E	2		29 98	30
28	57	59	N E	N E		2	29 75	29 48
29	58	63	N E	N E		2	29 32	29 32
30	60	70	S E	E		2	29 39	29 42
31	62	65	S E	S E	1	1	29 43	29 47

Results of Meteorological Observations for May, 1798.

Mean temperature of the Thermometer at sun-rise, deg. 56 19 hund.
Do. do. of the do. at 2 P. M. 67 45
Do. do. of the do. for the whole month, 61 82
Greatest monthly range between the 5th and 13th, 30 0
Do. do. in 24 hours, on the first, 18 0
Seven days it rained, and a very large quantity has fallen.
One day it thundered and lightned a small quantity.
Coldest day the 13th. Warmest day the 5th.

METEOROLOGICAL OBSERVATIONS *for June*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevailing winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	61	71	S	S W	2		29 49	29 46
2	64	79	S W	S W	1	1	29 41	29 41
3	66	81		S W	2		29 40	29 50
4	68	72	W	S E		2	29 60	29 57
5	67	76	S	S	1	1	29 42	29 38
6	69	74	S W	S	1	1	29 44	29 45
7	65	77	W	W	1	1	29 40	29 44
8	64	78	N W	S W	2		29 58	29 53
9	64	82	W	S W	2		29 53	29 53
10	60	68	E	S E	2		29 84	29 84
11	59	66	E	E	1	1	29 72	29 70
12	62	73	E	E	2		29 60	29 62
13	64	69	S E	S E		2	29 66	29 66
14	67	80	S	S	2		29 66	29 68
15	65	80	N	S W	2		29 70	29 70
16	62	71	N W	S E	2		29 60	29 64
17	58	67	E	S E	2		29 75	29 85
18	60	73	E	S E	2		29 90	29 81
19	65	77		S E	1	1	29 84	29 80
20	67	72	E	N E		2	29 68	29 60
21	70	80	E	S	1	1	29 43	29 43
22	65	77	N E	S E	1	1	29 52	29 52
23	74	83		S W	2		29 55	29 53
24	74	83	S W	S W	1	1	29 60	26 69
25	71	79	N W	S		2	29 66	29 60
26	70	74	N	N	1	1	29 60	29 66
27	64	78	N	S	1	1	29 67	29 68
28	67	80	S W	S	1	1	29 73	29 68
29	70	80	S W	S W	1	1	29 54	29 48
30	66	77	N W	S	2		29 68	29 70

Results of Meteorological Observations for June, 1798.

Mean temperature of the Thermometer at sun-rise,		deg. 65	6 hund.
Do. do. of the do. at 2 P. M.		75	9
Do. do. of the do. for the whole month,		70	7
Greatest monthly range between the 17th and 24th,		25	0
Do. do. in 24 hours, on the 9th,		18	0

Seven days it rained, and a considerable quantity has fallen.
Twice it thundered and lightned, but little.
Coldest day the 17th. Warmest day the 24th.

A TABLE *exhibiting the number of Patients received into the New-York Hospital, in each month; their Diseases, and the event of each Case.*

April, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Diſ. Diſ. and Eloped.	Under Care.
MEDICAL.						
Rheumatism	3	1	1			3
Syphilis	4	2	1		1	4
Pneumonia	7	3	1	1		7
Mania	7					7
Ascites	2			1		1
Anasarca	1					1
Dyspepsia	1					1
Catarrh	3		1			2
Intermit. Fever		1	1			
Diarrhœa		1				1
Debility	1	1	1			1
Palsy	1					1
Hemoptisis		1	1			
Enteritis		1				1
Hepatitis		1				1
Conſtipation		1			1	
Hyſteria		1				1
Febris	1					1
SURGICAL.						
Sore Legs	17	2	3			14
Syphilis	6	4			3	7
Frozen Limbs	8	3				11
White Swelling	3		2			1
Burn	1					1
Wound	1	1	1		1	
Cataract		1			1	
Fracture	2	1	1			2
Tumor		1				1
Opthalmia	1					1
DisorderedSpine	1					1
Scrophula	1		1			
Fiſtula in Ano	1					1
Cancer	2					2
Empyema	1			1		
Contuſion		2	2			

Result for April, 1798.

Remaining from last month,		77
Received this month,		29
		106
Cured,	17	
Relieved,	3	
Died,	3	
Discharged disorderly,	2	
Eloped,	5	
Under care,	76	106

May, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Diſ. Diſ. and Eloped.	Under Care.
MEDICAL.							
Rheumatism	3	3					6
Syphilis	4	2				1	5
Pneumonia	7	3	5				5
Mania	7	4	2				9
Ascites	1	1					2
Gonorrhœa		3	2				1
Anasarca	1						1
Dyspepsia	1						1
Catarrh	2						2
Diarrhœa	1						1
Debility	1	1		1		1	
Palsy	1	1					2
Enteritis	1						1
Hepatitis	1		1				
Hysteria	1						1
Febris	1	1	1				1
PhysconiaSplen.		1					1
Scrophula		1					1
Scorbutus		2					2
Febris Intermit.		1					1
SURGICAL.							
Sore Legs	14	4	7				11
Syphilis	7	4	2				9
Frozen Limbs	11		1				10
White Swelling	1						1
Burn	1						1
Cataract		1					1
Fracture	2		1				1
Tumor	1	2					3
Opthalmia	1	2	1				2
Fistula	1						1
Cancer	2		2				
Contusion		2					2
DisorderedSpine	1						1

Result for May, 1798.

Remaining from last month,	76	
Received this month,	39	
		115
Cured,	25	
Relieved,	1	
Eloped,	2	
Under Care,	87	115

June, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Diſ. Diſ. and Eloped.	Under Care.
MEDICAL.							
Rheumatism	6	1	3				4
Syphilis	5	13	1		2		15
Pneumonia	5	1	1				5
Mania	9	3	3				9
Ascites	2		1				1
Gonorrhœa	1		1				
Anasarca	1	1	1	1			
Dyspepsia	1			1			
Catarrh	2		1		1		
Diarrhœa	1	1			1		1
Debility		1			1		
Paralysis	2		1	1			
Enteritis	1				1		
Hysteria	1						1
Febris	1	1		1		1	
PhysconiaSplen.	1						1
Scrophula	1						1
Scorbutus	2	3		5			
Febris Intermit.	1	1	1				1
Erysipelas		1					1
SURGICAL.							
Sore Legs	11	7	3	1			14
Syphilis	9	5	3				11
Frozen Limbs	10		4			1	5
White Swelling	1						1
Burn	1						1
Cataract	1						1
Fracture	1	2	1				2
Tumor	3						3
Opthalmia	2	1					3
Fistula	1						1
Contusion	2	1		1			2
Hydrocele		1					1
DisorderedSpine	1						1

Result for June, 1798.

Remaining from last month,		87
Received this month,		44
		—131
Cured,		25
Relieved,		10
Died,		6
Eloped,		2
Under care,		88
		—131

SUMMARY

For April, May, and June, 1798.

Patients remaining under care, at the end of the quarter terminating March 31,		77
Patients received in the last three months,		112
		—189
Of these have been cured,		67
relieved,		14
died,		9
Discharged disorderly,		2
Eloped,		9
There remain under care, July 1st,		88
		—189

General Result for the first half-year of 1798.

Number of Patients under care at the commencement of the Year 1798,		90
Number received within the first half-year of 1798,		249
		—339
Cured,		191
Relieved,		15
Died,		20
Removed to the Alms-house,		1
Incurable,		1
Discharged disorderly,		3
by desire,		8
Eloped,		14
Under care,		88
		—341*

* This error (of two) arises from a mistake in placing the number remaining over from March, as 77 instead of 75, which is the true number.

A RETURN *of Patients admitted to the care of the New-York City Dispensary, from the 1st of April to the 1st of July, 1798.*

APRIL.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed &c.	Result.
Dyspepsia	1	1				
Vomica	1	1				Received 43
Erysipelas	3	3				
Diarrhœa	1			1		Cured 41
Psora	2	2				Died 1
Sore Legs	4	3			1 u. care.	Under care 1
Catarrhal Fever	2	2				—43
Dysentery	2	2				
Abscess	1	1				
Wound	1	1				
Contusion	1	1				
Small-pox	12	12				
Amenorrhœa	1	1				
Worms	2	2				
Bilious Colic	1	1				
Pleurodyne	2	2				
Syphilis	3	3				
Rheumatism	1	1				
Luxation	1	1				
Hæmoptisis	1	1				

MAY.

Rheumatism	2	1			1 r. A.H.	
Parturition	1	1				
Mumps	1	1				
Menorrhagia	1	1				
Small-pox	8	8				
Intermittent Fever	1	1				
Worms	1	1				
Herpes	2	2				
Syphilis	3	3				
Typhus Icteroides	1			1		
Phthisis Pulmonalis	1				1 u. care.	
Pneumonia	5	5				
Pneumonia Notha	1			1		
Burn	1	1				
Scrophula	1	1				
Remittent Fever	2	2				
Leucorrhœa	2	2				

MAY continued.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed &c.	Result.	
Sore Legs	2	1	1			Received	43
Dropsy	2				2 u. care.		—
Exomphalos	1		1			Cured 35	
Convulsions	1	1				Relieved 1	
Contusion	1	1				Died 2	
Opthalmia	1	1				Alms-h. 1	
Dysentery	1	1				Und.car. 4	—43

JUNE.

Herpes	5	3			2 u. care.	Received	44
Dyspepsia	1	1					—
Gastrodynia	1	1				Cured 34	
Syphilis	4	3			1 u. care.	Relieved 1	
Leucorrhœa	1	1				Died 1	
Rheumatism	2	2				Under care 8	
Wounds	4	4					—44
Croup or Hives	1			1			
Diarrhœa	1	1					
Bilious Colic	1	1					
Pneumonia	1	1					
Bilious Fever	2	2					
Cholera	1	1					
Convulsions	1				1 u. care.		
Dysentery	1				1 u. care.		
Asthma	1	1					
Sore Mouth	2	2					
Lumbago	1	1					
Cephalalgia	2	2					
Anthrax	1				1 u. care.		
Catarrh	1	1					
Pleurodyne	1	1					
Contusion	1	1					
Amenorrhœa	1	1					
Ophthalmia	1	1					
Parturition	1	1					
Luxation	2	1			1 u. care.		
Hectic Fever	1			1			
Scrophula	1				1 u. care.		

SUMMARY.

Admitted,	130
Cured,	110
Relieved,	2
Died,	4
Removed to the Alms-House,	1
Under Care,	13
Total	130

HUGH M'LEAN.

MEDICAL, PHILOSOPHICAL, & ECONOMICAL NEWS.

DOMESTIC.

NOTWITHSTANDING the uncommon duration and severity of the last winter, which led many reflecting and intelligent physicians to expect a dry, sultry, and sickly summer, the season, hitherto, with the exception of a very few extreme hot days, has been remarkably cool and rainy, and free from sickness. Letters from all parts of the United States concur in representing the condition of the country as unusually healthy.

Among domestic animals, however, we have still to notice the continuance of the *rabies* among DOGS, in some parts of Connecticut. Considerable mischief has been committed by them, among horned cattle and sheep, in the towns of Farmington, Berlin, and Middletown, since the publication of our last Number. Few accidents, as far as we can learn, have happened to men. In the town of Berlin, however, an instance of canine madness, in a young man of that place, has occurred, from the bite of a mad dog, the successful treatment of whose disease, seems to establish the efficacy of mercury, at least in some cases of that formidable calamity. We defer any mention of particulars at present, from an expectation of being soon able to gratify the public curiosity on this subject, by a full recital of all the facts by Drs. S. and J. Wells, of that town, under whose direction the remedy was so beneficially applied.

The AMERICAN ACADEMY OF ARTS AND SCIENCES have elected the following officers for the present year.

JOHN ADAMS, LL. D. *President.*

JOSEPH WILLARD, D. D. *Vice-President.*

The Hon. R. T. PAINE, FRANCIS DANA, BENJAMIN LINCOLN, and JOHN LOWELL, Esquires, JOHN LATHROP, D. D. JOHN WARREN, M. D. Hon. LOAMMI BALDWIN, CALEB GARNET, Esq. and PROFESSOR WEBBER, *Counsellors.*

JOHN DAVIS, Esq. *Recording Secretary.*

Mr. PROFESSOR PEARSON, *Corresponding Secretary.*

Rev. JAMES FREEMAN, *Treasurer.*

Hon. G. R. MINOT, *Vice-Treasurer.*

Rev. JOHN LATHROP, D. D. *Librarian & Cabinet-Keeper.*

At a meeting of the Massachusetts Medical Society, June 6, 1798, the following persons were elected officers for the year ensuing:

Isaac Rand, *President.*

Hon. Ebenezer Hunt, *Vice-President.*

Thomas Welsh, John Warren, M. D. William Eustis, Joshua Barker, Aaron Dexter, M. D. William Spooner, M. D. and Josiah Bartlett, M. B. *Counsellors.*

John Warren, M. D. *Corresponding Secretary.*

John Fleet, jun. *Recording Secretary.*

Thomas Kast, *Treasurer.*

William Spooner, M. D. *Librarian and Cabinet-Keeper.*

Thomas Kast, Joseph Whipple, Josiah Bartlett, William Spooner, and John Homans, *Censors.*

John Bartlett of *Roxbury*, and Isaac Hurd of *Concord*, were elected *Fellows.*

Mr. Webster, whose work on *Epidemics* may be expected in the course of the autumn, has lately issued the following circular letter.

CIRCULAR.

To the Clergymen or other well-informed Gentlemen in the several Towns in Connecticut.

"GENTLEMEN,

"No object can be more interesting to curiosity, or useful to the public, than a knowledge of the arts, agriculture, manufactures, and improvements of every kind, in the society to which we belong. Improvements in science are often slow, for want of publicity; and nothing will more directly facilitate the progress of practical knowledge, than a collection and communication of the items of experience which individuals are able to furnish.

"A statistical account of the United States is, and probably will, for a long time, remain a desideratum among the lovers of useful knowledge. But the State of Connecticut, compact in its form, and distinguished for the information, industry, and sober habits of its citizens, presents an inviting object to curiosity, without the objections which other parts of the American Republic offer to an attempt of this kind.

"I have some leisure and great inclination to be instrumental in bringing forward a correct view of the civil and domestic economy of this State; and if you will furnish me with the materials, I will arrange and publish them in a form that will, at least in part, supply the present defect of such a work.

"The particulars on which I request information, among others, which will occur to you, are the following.

"The name, extent, boundaries and quantity of land and water

in each town—with the time and mode of settlement. Indian names of rivers and mountains.

" Proportion of woodland, pasture, mowing and plough-land.

" Description of the soil.

" Mountains, hills, rivers, valleys, and whether waste or cultivated.

" Lakes, ponds, and on the sea coast, islands.

" State of health—climate and diseases.

" Bills of mortality, comprehending the ages and diseases, where it can be done.

" The years when remarkable sickness has prevailed, and the diseases.—Instances of longevity.

" Mode of cultivation, as to order of crops—species of manure used—produce of crops by the acre.

" Expence of tillage—value of land—price of labour, provisions, and produce.

" Remarkable instances of good and bad seasons.

" Trade and manufactures of the town—articles of export.

" Number of vessels, and seamen belonging to the town, and the produce of the fisheries.

" Harbours, ferries, roads and bridges—expence of repairs, and the mode of making them.

" Number of taverns.—Police of the town—number of poor—how provided for—and the expence.

" State of the churches and schools.

" Number of churches, their ministers—and the list of all, from the first settlement, with their times of settlement and exit.

" Number of winter and summer schools—expence of supporting them.—Academies, or grammar schools.

" Number of families and souls—number of houses—state of domestic manufactures.

" Mines, ore, minerals—mineral springs—has marle been discovered in the town, or coal or peat for fuel?

" Any curious or important information not falling under any of the foregoing heads, and other miscellaneous observations.

" I request the state of health, diseases and epidemics, with the bills of mortality, to be forwarded to me at New-Haven, by the first day of July next—Information under the other heads will be in time, if sent by the first of January, 1799.

" I am, Gentlemen,
" Your obedient Servant,
" N. WEBSTER, jun.

" P. S. Those towns which furnish the information requested will receive a copy of the work.

" *New-Haven, May* 7, 1798."

It deserves to be mentioned, as an incentive to similar undertakings in the different States, that the proposed editor has already received some materials for his intended work, and that there is the best reason to expect, from him and his correspondents, the amplest satisfaction, that circumstances will permit, on the several subjects proposed for investigation.

We learn, from New-Haven, that an useful machine has been lately invented by Mr. Abel Buel, of that city, for the purpose of planting onions. It is represented as very simple in its construction, and as having been found, on experiment, very greatly to abridge labour; so much so as to enable one man to perform, in the same time, the labour of twenty. It moves upon wheels, and can be easily drawn by one person. It opens the trenches, drops the seed, and covers them, at one operation. A machine which performs the same thing in the planting of corn, we are told, has been invented in the State of Vermont; and that a gentleman who was in New-Haven a few days since, is about coming to Philadelphia for a patent for the invention.

[*Weekly Magazine.*

At the Annual Commencement of *Columbia College*, which was held the second of May, the degree of Doctor of Physic was conferred on Mr. Adolph C. Lent, of the State of New-York; some account of whose Inaugural Essay is given in our REVIEW for the present number.

The MEDICAL LECTURES in COLUMBIA COLLEGE commence, annually, on the second Monday of November, on the following branches:

Chemistry and Natural History, by	Professor Mitchill.
Anatomy and Surgery,	Post.
Midwifery and Infantile Diseases,	Rodgers.
Theory and Practice of Physic,	Hammersley.
Materia Medica and Botany,	Hosack.

Regular *Clinical Lectures* are also given by Dr. Rodgers, in the New-York Hospital; which is furnished with a valuable collection of medical books.

Since the publication of the last number of the *Repository*, an Association has been formed in the city of New-York, for "the "investigation of the Mineral and Fossil bodies which compose "the fabric of the Globe; and, more especially, for the Natural "and Chemical History of the Minerals and Fossils of the United "States," by the name and style of The AMERICAN MINERALOGICAL SOCIETY. The present officers of the Society are—

Samuel Latham Mitchill, *President.*
Solomon Simpson, *Vice-President.*
E. H. Smith, *Secretary.*
Edward Miller, *Treasurer.*
Samuel L. Mitchill, *Librarian and Cabinet-Keeper.*

Samuel M. Hopkins, George J. Warner, Samuel L. Mitchill, *Committee.*

The Committee have already published, by the Society's direction, the following advertisement:

AMERICAN MINERALOGICAL SOCIETY.

The AMERICAN MINERALOGICAL SOCIETY, instituted in the city of New-York, desirous of obtaining and diffusing, by every means in their power, a correct and extensive knowledge of the mineral treasures of their country; and considering the importance of certain species of information, at the present time, earnestly solicit their fellow-citizens of the United States to communicate to them, on all mineralogical subjects, but especially on the following, viz.

1. Concerning the stones suitable to be manufactured into *gun-flints:* where they are found? and in what quantity? with samples of the material for experiment.

2. Concerning *native brimstone or sulphur*, or the waters or minerals whence it may be extracted: a description of the tracts of country where sulphur, or sulphureous springs and ores abound; with probable estimates of the practicability of collecting or extracting the sulphur economically; and with specimens of the native ingredient for trial.

3. Concerning *salt-petre:* where (if at all) found native? or the soils which produce it in the United States? of what extent? in what proportion? the mode of extracting or refining it? with specimens of native earth or salt for examination.

4. Concerning mines and ores of *lead:* in what places? the situation? how wide the vein? in what kind of rock it is bedded? with pieces of the ore for assaying.

Specimens of ores, metals, coals, spars, gypsums, crystals, petrifactions, stones, earths, slates, clays, chalks, lime-stones, marbles, and every fossil substance that may be discovered or fall in the way of a traveller, which can throw light on the mineralogical history of America, examined and analyzed without cost: sufficient pieces, with the owner's leave, being reserved for placing in the Society's collection.

Specimens of any of the above-mentioned articles, or *information* concerning any of them, may be forwarded (free of expence), and will be thankfully received and duly attended to by the subscribers.

Samuel L. Mitchill, Columbia College,
George J. Warner, No. 70 Maiden-lane,
Samuel M. Hopkins, No. 36 Pine-street,
} *Committee.*

New-York, July 20, 1798.

Having referred to certain parts of the present law of this State, relative to the prevention of infectious and pestilential diseases, and for the information of those who may not have seen the act referred to, it is thought proper to insert the material parts in this place.

An Act to provide against infectious and pestilential Diseases. Passed the 30*th of March*, 1798.

Be it enacted by the People of the State of New-York, represented in Senate and Assembly, That there shall be three persons appointed Commissioners of the Health-Office of the city of New-York, who shall assemble from time to time as occasion may require, at the Health-Office, for the execution of the business to them by this act entrusted; and that a person practising physic, shall be appointed Health-officer of the said city, who shall, by virtue of his appointment, always be a member of the said office: Provided always, that the several persons now holding and exercising the office of Health-Officer and Commissioners of the Health-Office of the city of New-York, shall and may continue in their respective offices until others shall be appointed in their stead.

And be it further enacted, That it shall be lawful for the said Commissioners of the Health-Office, or a majority of them, as they shall judge adviseable, to make and execute rules and orders for cleansing and scouring the streets, alleys, passages, curtilages, sewers, yards, cellars, vaults, sinks, and other places where filth and corruption collect within the said city, and for removing all offensive, noxious, or putrid articles or substances which may be stored or otherwise collected within the said city; and all necessary expences for carrying the said rules and orders into effect, where the same relate to the cleansing of such places as are not the property of private individuals or citizens, shall be deemed as part of the contingent expences of the said city, and the monies for defraying the same shall be raised in like manner as the other contingent expences of the said city; and where the same shall relate to the cleansing of such places as are the property of individuals or citizens, such expences shall be paid by the owners or proprietors, or occupiers, or possessors thereof: Provided all such rules or orders shall be reported to, and may be suspended or repealed at any time by the person administering the government of this State.

And be it further enacted, That whenever the city of New-York, or any part thereof, shall be annoyed or rendered foul by any

manufactory, trade, work, or business, producing noxious vapours, or highly offensive smells, or by any place where noxious or putrid substances shall be stored or collected within the said city; it shall be the duty of the said Commissioners, or a majority of them, if in their opinion the public health, or that of individuals shall be endangered thereby, to proceed forthwith to such place or places as aforesaid, and to make due inquiry and strict examination respecting the same; and to this end it shall be lawful for them, or either of them, whenever it may be necessary to require the aid or assistance of a justice of the peace and constable in making such inquiry and examination, who are hereby authorised and required to break open, whenever admittance cannot otherwise be obtained, the door or doors of such place where such manufactory, trade, work, or business is carried on, producing or affording such noxious vapour or highly offensive smell, or where such offensive substances are deposited; and if the said Commissioners, or a majority of them, shall judge any such manufactory, trade, work, business or repository, to be carried on or kept in such manner as to be a nuisance, they shall declare it so in writing to the owner or proprietor thereof, or in his absence, to such workman, clerk, keeper, or one of the family, as they may then find on the premises; and at the same time shall require the removal, abatement, or discontinuance of the said nuisance, as the case may require, within a time to be limited in the said writing; and if on the expiration of the said time, the same order shall not have been complied with, it shall be the duty of the Mayor or Recorder of the said city, upon representation thereof to either of them, made by the said Commissioners, or a majority of them, immediately to issue a warrant under the hand and seal of the said Mayor or Recorder, directed to the Sheriff of the said city, commanding him forthwith and without delay, to cause to be removed, abated or discontinued, such nuisance; and the person to whom such declaration and requisition in writing as aforesaid shall be made, shall besides, for not complying therewith, be considered as guilty of a misdemeanor; and on complaint being made thereof in writing, by any one or more of the said Commissioners, to any one of the justices of the peace of the said city, it shall be the duty of such justice to bind the person so complained of in a recognizance, with sufficient surety, in the sum of two hundred dollars, for his appearance at the then next general sessions of the peace in the said city, to answer to the said charge; and on due proof thereof, it shall be lawful for the said court to impose a fine on the person or persons so offending, in a sum not exceeding one hundred dollars; out of which fine, the expences of removing, abating, or causing to be discontinued such nuisance, shall be paid.

The remainder of the act is devoted to the usual provisions for quarantines, penalties, &c.

We understand that Dr. Benjamin De Witt, of Albany, the author of the paper on the deleterious effects of *Stramonium*, inserted in the present Number, intends speedily to publish a treatise on all the principal mineral and medicinal waters in the State of New-York. It is certain that few places abound with so many and such valuable mineral waters as the northern parts of this State; and it is equally certain that no general history has hitherto been given of their composition, or of the useful purposes they are fitted to serve.

ENTOMOLOGY.

With pleasure we announce to naturalists, Mr. Baker's collection of American insects. In his Museum at New-York, may be seen about three thousand species, principally arranged according to the Linnæan system. They were collected chiefly by Mr. JOTHAM FENTON, who has been nearly six years engaged in entomological pursuits. The species of this collection were mostly caught in the neighbourhood of the cities of New-York and New-Haven. For the accommodation of such persons as wish to purchase or exchange, Mr. Fenton has procured eighteen of each species. Complete sets of this collection may therefore be obtained from the proprietor, who is anxious for the cultivation of this branch of natural history. The collection is growing more valuable by additions almost every day, and bids fair to grow to a great size.

The *American Philosophical Society* have recently published the following circular Letter, which we insert with the hope of forwarding their design:

Philosophical Hall, Philadelphia, May 7, 1798.

(CIRCULAR.)

"SIR,

"THE American Philosophical Society have always considered the antiquity, changes, and the present state of their own country as primary objects of their research; and with a view to facilitate such discoveries, a permanent committee has been established, among whose duties the following have been recommended as requiring particular attention.

"1. To procure one or more entire skeletons of the Mammoth, so called, and of such other unknown animals as either have been, or hereafter may be discovered in America.

" 2. To obtain accurate plans, drawings and descriptions of whatever is interesting, (where the originals cannot be had) and especially of ancient Fortifications, Tumuli, and other Indian works of art: ascertaining the materials composing them, their contents, the purposes for which they were probably designed, &c.

" 3. To invite researches into the Natural History of the Earth, the changes it has undergone as to Mountains, Lakes, Rivers, Prairies, &c.

" 4. To inquire into the Customs, Manners, Languages and Character of the Indian nations, ancient and modern, and their migrations.

" The importance of these objects will be acknowledged by every lover of Science, and we trust sufficiently apologize for thus troubling you; for without the aid of gentlemen who have taste and opportunity for such researches, our means would be very confined. We therefore solicit your communications, now or in future, on these subjects; which will be at all times thankfully received, and duly noticed in the publications of the Society.

" As to the first object, the committee suggest, to gentlemen who may be in the way of inquiries of that kind, that the Great Bone Lick on the Ohio, and other places where there may be mineral salt, are the most eligible spots for the purpose, because animals are known to resort to such places.

" With respect to the second head, the committee are desirous that cuts in various directions may be made into many of the Tumuli, to ascertain their contents, while the diameter of the largest tree growing thereon, the number of its annulars and the species of the tree, may tend to give some idea of their antiquity. If the works should be found to be of Masonry; the length, breadth, and height of the walls ought to be carefully measured, the form and nature of the stones described, and specimens of both the cement and stones sent to the committee.

" The best methods of obtaining information on the other subjects will naturally suggest themselves to you, and we rely on a disposition favourable to our wishes.

" The committee consist of the following Gentlemen, viz.

Thomas Jefferson, President of the American Philosophical Society, at Monticello in Virginia.
James Wilkinson, Commander of the Army, at Head Quarters.
George Turner, of the Western Territory, near Cincinnati.
Dr. Caspar Wistar, Vice-President of the A. P. S.
Dr. Adam Seybert, Secretary of do.
C. W. Peale, and,
Jon. Williams,
} in Philadelphia.

" Your communications may be addressed to any one of the

Committee, but the articles you may think proper to furnish should be sent to this place.

In behalf of the Committee, I am respectfully,
Sir, your obedient servant,
J. WILLIAMS, Chairman."

ADVERTISEMENT *of the* CHEMICAL SOCIETY *of Philadelphia.*
To the Citizens of the United States.

The Chemical Society of Philadelphia, desirous of diffusing information throughout the United States relative to the manufacturing of Nitre, have appointed a committee to collect, into *one view*, all the different processes carried on for that purpose in different countries.

In pursuance of their appointment, they now take this method of requesting any persons who possess information relative to the manufacturing of this valuable *neutral-salt*, to forward it to them *(post paid.)* Information from such persons as carry on manufactories of it, with their results, would be peculiarly acceptable.

They would be obliged to any persons who would furnish them with accurate descriptions of the *situation*, *soil*, *temperature*, *&c. &c.* of those places in which Nitre is found in a *native state.*

Thomas P. Smith, No. 19 North 5th street,
Robert Patterson, No. 148 South 4th street,
John C. Otto, No. 37 North 4th street,
} Committee.

At a public commencement held in the *University of Pennsylvania*, on the 22d of May last, the degree of Doctor of Medicine was conferred upon the following gentlemen; who, on this occasion, defended their respective dissertations.

Thomas Horsfield, of Pennsylvania, on the Rhus Vernix, Rhus Radicans, and Rhus Glabrum; commonly known in Pennsylvania by the names of Poison-Ash, Poison-Vine, and Common Sumach:

Philip Gendron Prioleau, A. B. of Charleston, South-Carolina, on the use of the Nitric and Muriatic Acids in some diseases:

John Hahn, of Pennsylvania, on the use of Enemata, and the external application of medicines to the human body:

Thomas Triplett, of Virginia, on Apoplexy:

William Webb, of Virginia, on the Colic:

Isaac Winston, of Virginia, on the Polygala Senega, commonly called Seneka Snake-Root:

James Thurston Hubbard, of Virginia, on Puerperal Fever:

John Claiborne, of Virginia, on Scurvy:

John Archer, jun. of Maryland, on Cynanche Trachealis, commonly called Croup, or Hives:

William Cocke, of Georgia, on Tetanus:

And *James Stuart*, of Virginia, on the salutary effects of Mercury, in Malignant Fevers.

Dr. James Craik, of Alexandria, Virginia, is appointed Physician-General to the army of the United States.

Dr. James Hall is appointed Resident Physician at the Marine Hospital, of the Port of Philadelphia, in the room of Dr. James Mease, resigned.

At a stated meeting of the College of Physicians of Philadelphia, held July 3d. 1798, the following officers were duly elected:

Dr. JOHN REDMAN, *President.*
WILLIAM SHIPPEN, jun. *Vice-President.*
ADAM KUHN,
SAMUEL DUFFIELD,
THOMAS PARKE,
CASPAR WISTAR, } *Censors.*
BENJAMIN SAY, *Treasurer.*
THOMAS C. JAMES, *Secretary.*

We observe and notice, with great satisfaction, the re-publication, in Philadelphia and Boston, of the Essays of our illustrious countryman, Count RUMFORD; a work, which deserves to be found in the libraries and in the hands of all who sincerely desire the prosperity of their country, and the happiness of their species.

FOREIGN.

AMONG the most important medical publications which have appeared in Great-Britain, the last year, may be reckoned, "Medical Reports, on the Effects of Water, cold and warm, as a "Remedy in Febrile Diseases;" by Dr. James Currie, of Liverpool: and we regret that an accident has deprived us of the pleasure of laying before our readers an analysis of the work. The following facts appear to us too important to be passed over in silence:—The free use of cold air in the *small-pox* suggested to Dr. Currie the trial of another element; and his experience, though not large, leads him to affirm, that the affusion of cold water, in the eruptive fever of small-pox, has always mitigated the symptoms, and been followed by a mild disease. Instances are likewise given, by Dr. Currie, of the use of this remedy in the scarlatina anginosa,

(or canker rash); and in these it seemed entirely to extinguish the disease, and to preclude both the eruption and the sore-throat.

[*Monthly Review Enlarged, for Jan.* 1798.

The cultivation of rice is still continued in many parts of the kingdom of Valencia, in Spain, notwithstanding repeated prohibitions. Don Antonio Joseph Cavanilles, in his valuable work on the *Natural History, Geography, Agriculture, Population and Vegetable Products of the Kingdom of Valencia*, has entered into a very interesting discussion of the important question, whether the cultivation of this grain ought to be totally proscribed in Spain, on account of the fatal consequences attending it. To determine this point, he takes a review of the maladies occasioned by its cultivation, which requires a swampy soil, and, at the same time, a sultry climate. He gives a table of the births and deaths, from the year 1730 to 1787, in the different places in which the cultivation of rice has been practised. The result is, that during the space of fifty-eight years, there have been born 42,022 children in the places where rice was not cultivated, and only 36,248 where the cultivation of rice was carried on. On the other hand, during the same period of fifty-eight years, 39,595 persons have died in the places where rice was grown, and only 29,630 in the places where it was not cultivated. [*Monthly Mag. for Jan.* 1798.

Citizen Coulomb, some time since, caused several large poplars to be cut down on his estate. It was in the spring season, and the sap had begun to mount into the branches, which were covered with new leaves. As he was inspecting the workmen, he noticed that one of the trees, on being cut nearly through to the centre, emitted a sound similar to that produced by air bubbling from the surface of water. He perceived that this noise, as well as the discharge of a limpid and tasteless liquid, did not take place till the trees were nearly cut through to the centre. This led him to surmise, that the sap, in large trees, was only imparted to the branches by the medullary canal in the centre, with which the branches have a direct communication. To ascertain this point, he caused several large poplars to be pierced with a borer, when it appeared, that, within a certain distance of the centre, the instrument remained nearly dry; but no sooner did it penetrate to the middle, than a watery substance was emitted in great abundance, accompanied with the bubbling noise before mentioned. This effect was regularly produced on every repeated experiment during the summer; the sound, as well as the liquid emitted, bearing a due proportion to the precise degree of heat, and consequent transpiration of the foliage. At night, and during cold damp days, very little effect was discerned. From these experiments

it should seem that the only circulation of the sap in trees is effected by the parts which border on this centrical medullary canal, by means of the infinite number of horizontal *radii*, at the extremities of which the buds are formed, which establish a successive communication with the centrical canal. This communication, of course, augments in exact proportion to the growth of the bud till it becomes a branch. [*Monthly Mag. for Jan.* 1798.

Dr. Reimarus, correspondent of the Hamburgh Society, having remarked, that a few drops of belladonna, dissolved in water, and applied to the eyes, cause the pupil to dilate in so extraordinary a manner, that the iris is nearly reduced to nothing, was led, from this circumstance, to suggest the propriety of having recourse to this expedient, preparatory to the operation of couching the eye for a cataract. Of this intimation Dr. Grasmeyer, who practises this operation with great skill at Hamburgh, has made a very successful experiment. The effect produced, by the solution in question, on the eye, continues about half an hour, affording, by the dilatation of the pupil, an excellent opportunity of performing the operation, without danger of hurting the iris; and the palsy, if it may be so termed, which invades the retina, prevents the baneful consequences which otherwise might accrue from too sudden accession of light. [*Monthly Mag. for Jan.* 1798.

Gerard Vrolick, Professor of Physic and Botany at Amsterdam, has published a dissertation, at Leyden, on the annual defoliation of trees and vegetables; in which he maintains, that the leaves of trees have a distinct vegetable life, characterized by different periods, though connected with the life of the parent tree, and in some measure dependent thereon. On the annual return of the period of defoliation, the leaves drop off, and perish with age, but the life of the stock subsists. He maintains, that the dead leaves detach themselves from the branches by the same laws which cause any mortified part of an organized body to separate itself by the absorption of the live particles immediately connecting the decayed and healthy members. To prove this assertion, he cites examples from organized animals, which, as well as vegetables, possess many parts endowed with a distinct and separate life. Thus, for instance, the fœtus of frogs are furnished, on the sides of the head, with organs of respiration, analogous to the gills of fishes. These organs in a short time become indurated, die, and drop off, before the *individuum* has attained to the perfect developement of its existence. The horns of stags, which fall off and renovate every spring, complete, in the space of a year, all the successive periods of their distinct life; but a series of years is necessary to atchieve the different periods of the existence of the animal.

[*Monthly Mag. for Jan.* 1798.

The great consumption of soap, which, of course, is attended with a proportionate consumption of oil, renders the manufacture of woollen cloths very expensive. Several attempts have therefore been made to dispense with this ingredient, by substituting pot-ashes in its stead: but the strong alkaline properties of the latter never fail to corrode the cloth and render it unserviceable. To remedy this inconvenience, M. CHAPTAL has made experiments of a very ingenious process, by saturating the alkaline liquid wool, previous to its application to the manufacture of cloths. After lixiviating the ashes, he saturates the water, and lets it evaporate to a certain degree. He then throws into this lixivium pieces of cloth and wool, taking care to stir the composition till the rags are completely dissolved. An adequate proportion of wool is superadded, till the corrosive qualities of the liquid are perfectly absorbed, when it may be used without the smallest inconvenience or danger. It communicates an excellent gloss on the cloth, renders it completely supple, and, in every respect, answers all the purposes of common soap. It is necessary to observe, that the cloth, in the first instance, acquires a very strong and disagreeable smell, which, however, vanishes on its being bleached. And, secondly, the indiscriminate use of pieces of cloth, of various colours, in saturating the lixivium, communicates a dusky tinge to the cloth, which proves no detriment to dark cloths, but considerably affects the glossiness of lighter colours. This inconvenience is easily obviated, by employing, in the latter case, only *white* rags for saturating the lixivium. [*Monthly Mag. for Feb.* 1798.

The art of manufacturing a soap from refuse wool, hair, horns, hoofs, and other similar animal matters, was invented last year in France, and the method has been detailed in the "*Annales de Chimie.*" Upon this discovery is founded a *Patent for a new method of making Soap*, which in January last was granted to Mr. JOHN CROOK, of Edinburgh, Chemist.

The basis of this manufacture is refuse *fish* of all kinds, as well as the animal matter that remains after the extraction of fish-oil. The fish, after being coarsely mashed, are put into water and washed from the blood and dirt, and afterwards are added gradually to a boiling solution of caustic alkali, till it refuses to dissolve any more, or is completely saturated. A quantity of coarse oil or tallow, equal in weight to $\frac{1}{8}$ part of the fish, is next added, and the mixture, while boiling, is united with as much turpentine alone, or turpentine and palm-oil, as the operator chooses. The soap thus formed, is to be exposed in a broad shallow vessel, for the space of about six weeks, to the open air, after which it is ready for use as a *soft soap*. The process for *hard soap* differs but little from the foregoing; the proportion of oil, or tallow, is to be equal to the weight of the fish

employed; and, after the addition of the rosin and palm-oil, the mixture is to be well boiled with common waste ley, and finished in the usual manner.

To the same specification is added a new method of bleaching, in which the only difference between this and the common mode of employing oxygenated muriatic acid, consists in the substitution of lime-water to an alkaline solution, in the application of the gas.

[*Monthly Mag. for Feb.* 1798.

The following additional information, respecting the use of Oil as a remedy for the Plague, is extracted from the Monthly Magazine for April last.

To the Editor of the Monthly Magazine.

SIR,

In addition to the interesting account of the use of oil, in curing the plague, given in your Magazine for November last, permit me to offer you an original treatise, from the Rev. Father LEWIS of Pomia, administrator of the hospital of St. Anthony, at Smyrna, given by him to a friend of mine while at that place, some years ago, and containing an account of his use of oil, in curing the plague. I understand that the idea of the use of oil, in this disease, was suggested to Mr. BALDWIN, by observing that none of the porters constantly employed in loading the vessels with oil, in the various ports of the Mediterranean, and whose clothes and bodies were constantly swathed with that fluid, were ever attacked by the contagion, even when most prevalent. He communicated this observation to Father LEWIS, and he could not have pitched upon a person better fitted to bring its truth to the test of experiment.

Father LEWIS, I am informed, was originally a Frenchman of noble birth and liberal education. From some circumstances with which I am not acquainted, he was induced to dedicate himself to a religious life. And he concluded, that there was no way in which he could at once so completely testify his constant reliance on Divine Providence, and, at the same time, benefit his fellow-creatures, as becoming a religious assistant to an hospital established for the relief of persons afflicted with the plague, and administering of comfort to those whom all the world rejected.

With this view, he repaired to Smyrna, and attached himself to the hospital established there exclusively for those afflicted with the plague. His zeal and assiduity soon made him spiritual rector of the establishment, a situation which he so well deserved to fill. He has had three or four attacks of the plague, one of which totally deprived him of the sense of smell. This he considers as a great blessing, as it was the sense most offended in the course of his ministry. Before he was deprived of smell, he could generally judge pretty accurately by that means, whether a patient, when

brought into the hospital, would live or die. He does not hesitate to perform every office about a person in every stage of the pestilence, with no other precaution than to avoid inhaling their breath. No doubt, being habituated to the notion of contagion, and having a firm and unshaken reliance on the protection of Providence, tend to guard him against infection. He has been in his present situation near twenty years, and every friend to humanity must wish that he may long continue to fufil his arduous duties.

It is worthy of remark, that some cases have lately been published in this country, where inunction with oil, together with forcing small quantities of it down the throat, seem to have cured the dreadful contagion of hydrophobia, even after the disease had begun.

The Italian is in Father LEWIS's own hand-writing, and in the translation more attention is paid to accuracy than elegance.

Your's, A. P. P.

London, Jan. 1798.

TRANSLATION *from the Italian of a Paper of Father* LEWIS, *of Smyrna, on the Use of Oil, as a Cure for the Plague.*

The wonderful effects which have been produced by the inunction with common oil, in the present year, 1792, in this our city of Smyrna, miserably afflicted with the pestilential contagion, must necessarily render ever renowned the celebrated Signior BALDWIN, ingenious inventor of it, and the first who practised it during the last year, at Alexandria. But it will also oblige every one that loves, according to the divine precept, to succour his neighbour in the most lamentable and wretched condition, to which any man can be reduced on earth, not to neglect to bestow on him so meritorious an act of Christian piety, and humane commiseration; and to thank God, after so many ages, in which those who were so unfortunately afflicted with the plague have been abandoned, without hopes of any probable remedy, to the consequence of their disease; he hath at last vouchsafed, by the means of the said Signior, to make known a specific, as easily procured as it is useful to the relief and ease of the afflicted.

The repeated trials made with my own hands, not as a physician, which perhaps would not be of so much importance, but as the overseer of an infirmary which is under my own management, persuades me of what, without any exaggeration, I affirm; and notwithstanding those who acknowledge theory as the only guide of their medical operations, considering, for my part, experience as the tale-bearer of facts, I freely say, that the smearing with oil, after the manner of Mr. BALDWIN, is the only medicament which practically seems to promise to turn out a real method, by which we may be enabled to cure this contagious disease, which disgrace-

fully* —— —— and that all the other discoveries, which during full twenty years that I have assisted those afflicted with plague, I have seen used in Smyrna, have in general appeared to be the productions of presumptuous ignorance, or wretched ostentation; and, therefore, not only useless, but prejudicial to such as, with a foolish enthusiasm, put their trust in them.

I shall not attempt philosophically to account for the facts I am about to detail. But guided, as I have already said, by experience alone, I submit the observations I have uninterruptedly made on the effects of the unction, during a period of five months, to the dispassionate judgment of those who are acquainted with such matters, hoping, that they will not attribute to imposture or deceit what is said in the pure spirit of doing good to my fellow men.

I have seen, then, that in the inunction with oil —— —— —— and acts rather by shutting than by opening the pores —— —— —— —— but over the whole of the body, so as to produce a most copious sweat, preserves for the most part from new foundation of buboes, and tends to bring those which have already appeared to a suppuration, with the assistance of emollient cataplasms, which, in general, are extinguished with the cessation of the sweat.

Secondly, I have observed that the inunction should be followed by a considerable degree of friction of the limbs of the patient; and also, that these remedies should be applied as soon as possible after the attack of the disease; for if four or five days are suffered to elapse, as has happened in some patients, they are no longer of any use.

Thirdly, That none have been benefited by the inunction, however accurately performed, whose nervous system has been attacked by the malady, or who were afflicted with diarrhœa, both of which have always been considered by me, as well as by others, as fatal symptoms in this complaint, impossible to remedy.

Fourthly, Exclusive of those already seized with these mortal symptoms, I attribute to the inunction with oil, in which I repose the greatest confidence, the cure of sixty-four of my patients, who amounted this year to the number of one hundred and fifteen; as well as sixty-five others, which either by me, or by Signior Ebazaro d'Etian, physician to the plague-hospital, were anointed in this manner; and, I conclude, that if the inunction did not succeed with those who died, it was either because the consultant physicians refused it a trial, or because it was not had recourse to in time, or because it was not followed up with the requisite attention.

[*Monthly Mag. for April*, 1798.

* Where blanks are left the original is defaced.

It appears from the succeeding letters that some debate concerning the anti-syphilitic powers of Nitric Acid, still continues in Great-Britain. In our next Number we hope to throw some light on this subject, from domestic sources.

To the Editor of the Monthly Magazine.

SIR,

It is well known that many medical men have been lately engaged in making experiments to ascertain whether, or not, the *venereal disease*, in all its complicated forms, can be radically cured by medicines containing a large proportion of oxygene, or vital air; and particularly by means of the nitrous acid and oxygenated muriate of pot-ash.

The very respectable testimonies which have already appeared in favour of these remedies, and the mild as well as expeditious manner in which they are said to operate, have induced me to give them a fair and unprejudiced trial, in a great variety of cases; and also to solicit the communications of other gentlemen in London, who have had opportunities of exhibiting them: but I am sorry to observe, that our experience obliges me to differ in opinion from those physicians and surgeons who have raised our expectations on this subject.

This diversity of opinion being founded on actual observation, and not any preconceived notions, has emboldened me to use the freedom of circulating a printed letter, to recommend the trial of the new medicines in advanced stages of the disease; *where well marked blotches, nodes, ulcerated fauces, ozæna, and other characteristic symptoms of a genuine syphilis appear:* since in these cases only can we be fully assured that the syphilitic poison exists in the constitution, and indubitably requires the administration of an anti-venereal medicine.

The most judicious practitioners, and those of the largest experience, are ready to confess, that although it be usually adviseable to give mercury in recent stages of the venereal disease, with a view to prevent the farther progress of the symptoms, or the occurrence of a confirmed lues venerea, yet in very many such instances, the patients would escape and recover their health, by a proper plan of treatment, without the use of mercury: and, notwithstanding this fact may be denied by some speculative persons, it is too well authenticated for us to rest the proof of an anti-venereal remedy *solely*, or *even chiefly*, on its efficacy to remove the primary symptoms. All deductions from such premises must, therefore, be extremely fallacious and questionable.

I have taken the liberty to trouble you with these cursory hints, for the attention of medical men in the country, in hopes that you will favour me by inserting them in your Magazine: and I beg

leave, at the same time, to suggest, that it is my intention to publish the result of my experiments and inquiries, (under the title of "*Critical Remarks on the Venereal Disease,*") together with such observations and cases as I may be honoured with from other practitioners.

W. BLAIR.

Great Russel-street, Bloomsbury-Square, Jan. 22, 1798.

[*Monthly Mag. for Jan.* 1798.

To the Editor of the Monthly Magazine.

SIR,

In the collection of observations on nitrous acid, now in the press, and of which the first (and perhaps the second) *century* will appear in March next, I shall have the satisfaction of producing evidence from very various and distant quarters. I shall give a second letter from Mr. SCOTT of Bombay. The positive evidence is such as appears to be incapable of being invalidated by negative; especially as the facts to be brought forward will account to a certain extent for the general failures that are said to have been experienced in some places.

Some correspondents, who are advantageously situated, have been obliging enough to vary their trials considerably; and even to extend them to gonorrhœa.

I am, Sir, yours,

Clifton, Jan. 1, 1798. T. BEDDOES.

P. S. I have seen great service from the nitrous acid in hepatic and dyspeptic cases. Several facts of the same nature have been generally mentioned to me. If particulars were transmitted to me, I would print them as an appendix to the Syphilitic Collection.

[*Monthly Mag. for Jan.* 1798.

To the Editor of the Monthly Magazine.

SIR,

The last number of your Magazine announces that Dr. BEDDOES will soon favour the public with one or two more centuries of observations, on the anti-venereal effects of nitrous acid; and that he thinks he shall be able to bring forward such facts as shall, in some measure, account for the general failures that have happened. From an hint which this respectable physician has dropped, it appears, that "only a second letter from Mr. SCOTT, of Bombay," has yet fallen into his hands: I therefore conceive, that it may be a piece of agreeable intelligence to him, as well to the other advocates for "*the new specific,*" to be informed, that several letters have been lately received from Bombay, in which Mr. SCOTT endeavours to corroborate his former remarks, and proposes another mode of administering this remedy. In the fourth letter, dated August the 5th. 1797, he relates "A case of lues

venerea cured by bathing in the diluted nitric acid, that affords (he says) the most satisfactory evidence of its great and truly surprising efficacy:" and he even supposes that this method "is still more effectual than its internal use." The ingenious author concludes with these remarkable words: "In a few years, I think, that mercury, as a remedy for the lues venerea, will be banished by this acid; and, in some of my dreams for the improvement of the condition of man, I even imagine, that the poison of Syphilis may, in a great measure, be extinguished over the face of the earth, not by the efforts of the magistrates, but *by an agent like this, safe, simple and efficacious.*"

As the result of my own trials, in near sixty cases of lues venerea, differs, *in toto*, from the experience of Mr. SCOTT, and of many other gentlemen, I cannot but feel anxious to see a detail of "the facts" which Dr. BEDDOES has promised; and as the truth, wherever it may lie, can only arise from the general mass of evidence, I shall deem it incumbent upon me, to publish all my cases, as soon as the other duties of my profession afford me leisure. In the interim, I shall be happy to receive such additional communications as practitioners may please to honour me with. Every case, faithfully drawn up, will serve to throw light on this interesting subject; and therefore ought not to be lost to the public.

I cannot forbear suggesting a hint, which, I fear, some of our zealous experimenters stand in need of; that an hasty opinion may be the occasion of accumulated sufferings to our patients; and that a wise man will suspend his judgment until the matter of inquiry shall have been fully investigated: the introduction of a doubtful remedy, and the rejection of an almost infallible one, in the treatment of syphilis, is too serious an affair to be trifled with.

I remain, &c. W. BLAIR.

Great Russel-street, Feb. 20, 1798.

[*Monthly Mag. for Feb.* 1798.

To the Editor of the Monthly Magazine.

SIR,

The attention of medical men has lately been much directed to the effects of the Nitric Acid, exhibited internally: and though those effects have been found very different, by different practitioners, yet it is evident, from the whole collective testimony, that a very valuable medicine, which had been hitherto wholly neglected in its uncombined state, is added to the *Materia Medica.*

But as the disagreeable taste which it possesses, and the bulky form in which it has been given, have raised objections to its use, it is a matter of consequence, that gentlemen, who are engaged in making trials with it, should have early information, that there is great probability that the Nitric Acid, diluted to the degree at

which it has been given by the mouth, is, like Mercury, when applied to the skin, absorbed, and afterwards produces in the system the same effects that arise from its internal use.

By the last fleet from the East-Indies, I received a letter from Dr. SCOTT, of Bombay, the gentleman who first recommended, and himself commenced, the internal use of the Nitric Acid. Inclosed was a pamphlet, containing, in addition to the letters which he had before published, two additional ones, in which he communicates this important information, not founded on conjecture only, but on actual experiment.

In one inveterate case of Syphilis, in which the relief from Mercury had been imperfect and temporary, Dr. SCOTT applied cloths, wet with the Nitric Acid; with these the legs of his patients were surrounded, and the cloths were kept moist with additional water, for an hour or two daily. The relief received was remarkable. The symptoms, which were of the worst kind, disappeared; his strength returned; and, at the end of three months, he continued in good health, though, during that period, he used no other remedy than Nitric bathing.

In other cases, Dr. SCOTT caused the legs, and part of the thighs, to be immersed for an hour, night and morning, in water, acidulated with Nitric Acid, as far as the skin could bear it without uneasiness. This mode was attended with equal success. And, as a small quantity of Acid is sufficient to acidulate a large portion of water, and as the same acidulous water will last for a long time, Dr. SCOTT observes, that a bath so large as to cover the whole body may be prepared at a small expence.

From the marked action of the Nitric Acid, on the resinous substance of the bile, Dr. SCOTT thinks it probable, that bathing in dilute Nitric Acid may be serviceable in the early stages of the Yellow Fever. I am, Sir, your very humble servant,

Manchester, Feb. 22, 1798. THOMAS HENRY.

[*Monthly Mag. for Feb.* 1798.

To the Editor of the Monthly Magazine.

SIR,

When I wrote my note of Jan. 1, 1798, (which you inserted in your number for that month) I had not indeed seen Mr. SCOTT's third and fourth letters: neither had your correspondent Mr BLAIR. For the ships, by which they were brought, had not arrived. By those ships Mr. SCOTT sent me a copy, requesting I would reprint the letters, in any publication which I might be preparing on the subject of nitrous acid. But I have since received from Mr. SCOTT, instructions *to suppress what he says about the effect of bathing*, as he is not satisfied with his trials. This retraction, together with remarks on some material points, will appear in the collection

now in the press; for it is too late (in consequence of what has been published here) to suppress the remarks on the nitrous bath, as the author wished.

I am afraid the collection of cases will be a few weeks longer in appearing than I gave reason to expect. A considerable number of communications are printed. But some, which were promised two months ago, are not yet come to hand—and I could wish to present the public with a respectable body of facts. I find by my correspondence in America, that they have been employing nitrous acid there—"*with various, but, for the most part, with good success.*"—I hope we shall, ere long, know how far this and the other substances newly brought into question, are useful—that we may use them so far, and no farther.

I am, Sir, with good wishes for the success of your exertions, yours,

THOMAS BEDDOES.

March 7, 1798. [*Monthly Mag. for March*, 1798.

The benevolent Dr. Lettsom, of London, published, in 1797, the first volume of a work entituled, "HINTS designed to promote Beneficence, Temperance, and Medical Science." It is a loosely-printed 8vo. of somewhat less than 300 pages. This publication, though consisting chiefly of the author's earlier performances, and but in part devoted to medical objects, may be read with advantage by physicians and students in general, and by all who have leisure and inclination for the pursuit of beneficence, temperance, and health.—The two first papers in this collection are—1. HINTS designed to promote the establishment of a *Dispensary*, for extending medical relief to the poor at their own habitations; and, 2. HINTS for the establishment of a *Medical Society* in London. Institutions of these kinds are met with in several places in the United States; and it is much to be desired that their number may be increased as long as medical science and wealth are so imperfectly distributed. Some useful *hints* may be extracted from these papers, to that end: to which we may add a remark, relative to medical associations, that a very general and radical defect of these institutions has been their comprizing too great a number of persons, and men more discordant in their manners and principles than in their professional opinions.

The fourth Essay is, "HINTS for establishing a Society for promoting useful Literature." The main object of the writer has since been well supplied by the establishment of the literary fund. In the United States, however, an institution, in some degree common to every State, is desireable, for the promotion of letters, by encouraging sales of native literary productions. This is a *hint* which we hope to see enlarged, and applied in a more suitable place

The fifth, sixth, and seventh papers—viz. HINTS respecting the immediate Effects of Poverty; HINTS respecting the Distress of the Poor; and HINTS respecting a Substitute for *Wheat Bread*, apply only partially to our country. There are many occasions, however, in several of our large towns, for the exercise of that benevolent disposition which dictates these *hints;* and the reformer of our municipal regulations, which are, in many respects, shamefully deficient, will do well to consult them.

The next Essay—HINTS respecting the Effects of a *Little Drop*—deserves to be faithfully read and meditated by every citizen; and, in connection with Dr. Rush's paper on the effects of spirituous liquors, and Dr. Beddoes' introductory lecture, merits to be circulated, by means of all our periodical publications, particularly our newspapers, to every village in the United States. To this Essay, the next—HINTS respecting the Effects of *Tavern Feasts*—is an excellent appendix.

The thirteenth paper—"HINTS for promoting a BEE SOCIETY," should receive the attentive perusal of the agriculturist and country gentleman.

It will be doing a real service to the interests of mankind to publish a neat and cheap edition of this volume in our country; nor do we doubt of its being so well received as to make it worthy the attention of some enterprizing bookseller.

The reader will recollect the account given of a new and successful mode of treating *Diabetes Mellitus*, discovered by Dr. Rollo, in vol. i. p. 259. Dr. Rollo's work has since come into our hands, which enables us to present the following additional particulars.

The author supposes the nature and treatment of *Diabetes Mellitus* may be explained on the new doctrines of Chemistry; and that the disease may be believed to depend on a hyper-oxygenated state of the system, formed by a morbid condition of the stomach, and peculiar combinations in it, probably afterwards maintained by a certain condition of the skin and lungs. Hence the obvious remedies would be those abstracting oxygene from the system, removing the morbid condition of the stomach and its peculiar combinations, and changing the condition of the skin and lungs.

From two cases of this disease, treated by Dr. Rollo, he draws the following inferences: 1. That the Diabetes Mellitus is a disease of the stomach, &c. proceeding from some morbid change in the natural powers of digestion and assimilation. 2. That the kidneys, and other parts of the system, as the head and skin, are affected secondarily and generally by sympathy, as well as by a peculiar stimulus. 3. That the stomach-affection consists in an increased action and secretion, with vitiation of the gastric fluid,

and probably on too active a state of the lacteal absorbents. 4. That the cure of the disease is accomplished by a regimen and medicines preventing the formation of sugar, and diminishing the increased action of the stomach. 5. That confinement, an entire abstinence from any species of vegetable matter, a diet solely of animal food, with emetics, hepatized ammonia, and narcotics, and occasionally the use of sulphur and castor oil, when requisite, comprehend the principal means to be employed. 6. That the success of the treatment in a great measure establishes the five preceding inferences.

From Dr. Rollo's work on *Diabetes Mellitus*, we extract the following notice of the intended use of acids in the malignant fevers of the West-Indies. See. vol. i. p. 310.

"The nitric and citric acids have not been fully tried in fever. There is now, however, a prospect of their soon being so, as on this subject we have written to *Dr. Chisholm*, who has an extensive range of practice by his appointment of *Inspector of Ordnance Hospitals, in the West-Indies;* and for this purpose a quantity of nitrous acid has been sent out, on our recommendation, by the BOARD OF ORDNANCE—of the citric acid there is plenty in the country. We have no doubt he will try both acids in the fever, and those affections in which he has given mercury with success. We are happy in having, by our recommendation to *Dr. Chisholm*, unknowingly co-operated with the wishes of *Dr. Currie*, of *Liverpool*, who has informed us, that he has made application to SIR JOSEPH BANKS, requesting him to solicit government to send out nitrous acid to the West-Indies, to be used in the fever, which has proved so fatal to the soldier and the sailor." It also appears, from a subsequent part of the publication, that Dr. Currie has written, on his personal account, to the West-Indies, to the same effect.

In vol. i. p. 123, we stated, in very general terms, an account of some experiments concerning the effects of compression of the extremities by the tourniquet, in stopping the cold fit of intermittents, made by Mr. Kellie, a surgeon in the British navy, published in the 19th volume of Duncan's Medical Commentaries.

In the 2d vol. of Duncan's Annals of Medicine, we find a further account of similar experiments made by Mr. Kellie. From the facts related in his first publication, he thought himself warranted to conclude—1. That at any time during the cold fit of an intermittent, if tourniquets be so applied as to obstruct the circulation in two of the extremities, in three minutes thereafter the hot stage will be induced. 2. That if tourniquets be applied, previous to the accession of the paroxysm, the cold stage will be entirely prevented. 3. That when the cold stage of an ague is

either thus shortened, or altogether prevented, the following hot stage is rendered both milder and shorter in duration.

From experiments made on himself, Mr. Kellie concludes that, in the healthy body, compression of two or more extremities, by tourniquets, occasions—1. An increased frequency, fulness and strength of the pulse, soon after followed by a diminution of the frequency. 2. Increase of heat and flushing, especially of the face and breast. 3. Anxiety, more frequent respiration, and a sense of fulness about the præcordia, gradually increasing till the person becomes vertiginous and faint. 3. If the compression be continued for 20 minutes or half an hour, the vision becomes confused, objects appear clouded or double, small black spectra are seen to float before the eyes, drops of sweat stand on the face, neck and breast, and the increasing tendency to deliquium demands the removal of the tourniquets. 5. On restoring the circulation, these symptoms almost immediately vanish, a coldness about the præcordia, chilliness of the whole body, attended sometimes with shudderings and yawnings, are perceived; the blood flows with a painful heat through the vessels which had been compressed; the whole limb is suffused with a glow, succeeded by a sensation of prickling; the pulse continues slow, and generally becomes slower than it was before the compressions were removed, beating, at the same time, full and soft. 6. If the circulation be obstructed in one arm for 15 minutes, or half an hour, on the removal of compression the pulse becomes fuller and stronger than in the other arm.

If the tourniquets be properly applied, so as instantly and completely to compress the artery, the veins of the compressed limb do not swell, and the limb itself feels soft and flaccid rather than hard.

In intermittents, the compression of the two iliac arteries, or of one iliac and one subclavian, may be continued for 10 or 15 minutes at the commencement of the cold stage; but if continued longer, on removal of the tourniquets the rigors and succussions may return.

From observing the effects of compression in intermittents, Mr. Kellie was induced to try it in other febrile diseases; and the results of 13 different cases induce him to conclude—1. That compression by the tourniquet, in the incipient stages of pyrexia, like emetics, sometimes arrests the disease. 2. That in other and more advanced stages of pyrexia, compression may be employed to moderate the symptoms;—when phlogistic diathesis prevails, the application should be continued till vertigo and tendency to deliquium be induced, which will be found much to diminish the action of the heart and arteries; but in cases of arterial debility, the compression should only be continued while the pulse remains fuller,

stronger and slower. 3. That when employed in acute rheumatism, the vigour of circulation, heat and pain are for a few minutes increased; that in from 5 to 15 minutes, the pains are totally removed; that in 15 or 20 minutes the heat is diminished, and the velocity of the pulse reduced; that, on restoring the circulation, the pulse becomes slower, and the temperature of the skin more moderate; that these symptoms, thus relieved or removed, seldom return for several hours, sometimes not for a whole day; and that the following attacks are less severe than the preceding ones. 4. That, in acute rheumatism, the tourniquets should be applied on the affected extremities. And, lastly, that rheumatic pains, without fever, may be thus certainly removed or relieved.

Mr. Kellie is disposed to think, that inflammations of the extremities might be speedily cured by compressing the arteries which supply the affected parts, by opening a correspondent vein, or by scarifying the inflamed surface. Such a practice might, he suggests, be very useful in the incipient state of white swellings, and in acute inflammations of the joints.

Compression, Mr. Kellie supposes, must cause a greater quantity of blood to pass through the heart and lungs in a given time, and a larger supply to be sent to the brain and other viscera. These organs must, therefore, be stimulated into greater exertions; and hence the first effects of compression are, increased vigour of circulation, and the removal of atony. In this manner it will serve as a remedy in diseases of debility.

But as the long-continued operation of any stimulus must, at length, produce an inert or quiescent state of the system; so, if compression be long applied, the force of the circulation will be diminished. And on this principle we must explain the seemingly opposite effects of compression in exciting the system from the torpor which prevails during the cold chill of intermittents, and in allaying the excessive action of acute rheumatism.

Mr. Kellie also supposes that this mode of partially arresting the circulation may affect the system by compressing the brain. In order to allay the violent action of the heart and arteries, in inflammatory fevers, Dr. Darwin proposes gentle compression of the brain, produced by whirling the patient round in a suspended bed, with the head most distant from the centre of motion. By compressing the two subclavian arteries as they pass over the first rib, Mr. Kellie assures us, the same purpose may be accomplished in the safest, easiest, and most effectual manner.

We have received from Paris, since our last Number, the Work of Dr. Swediaur, therein referred to, entitled, "Traité complet sur les Symptômes, les Effets, la Nature, et le Traitement des Maladies Syphilitiques;" *published in March last, in two vols. 8vo.*

In this work Dr. Swediaur delivers, at some length, his reasons for supposing that mercury subdues the venereal virus, in virtue of the oxygene which its various preparations contain; but this reasoning, though ingenious and interesting, cannot be reduced within the necessary limits of the present article.

He refers to a memoir, read before the Society of Medicine, on the 7th Messidor, 5th year of the Republic, by Citizen Alyon, one of the medical officers of the Military Hospital of Val-de-grace, in Paris, a former pupil of Professor Fourcroy, on the anti-venereal and anti-psoric virtues of oxygene, which throws much light on this important subject.

For nearly three centuries, says Citizen Alyon, has mercury been tortured in a thousand different ways, and its preparations multiplied, without any satisfactory explanation of its effects upon the animal economy. It was, indeed, conjectured, some time ago, that mercurial preparations owed their efficacy to oxygene; but it remained to support this theory by unexceptionable facts. Who, says he, could ever consider mercury as an anti-syphilitic remedy in its metallic state? Who does not know that many pounds of it may be swallowed without injury, and that it will pass through the alimentary canal, not only without danger, but without effect? But, besides, it is now well understood that mercury is the most oxidable of all the metals; that, in order to combine it with oxygene, it is sufficient to agitate it in the air; that saliva can convert it to oxyd; that, on the other hand, it is remarkably de-oxidable; and that it easily abandons the oxygene with which it is combined. If these things are considered, and if the facility with which oxygene unites with animal matter, and the tendency which the latter possesses to seize it from acids and oxyds, be duly recollected, it must be readily conceived in what manner all mercurial preparations operate. To find, therefore, a powerful anti-syphilitic remedy, an active and permanent stimulant, it will be sufficient to take a substance, containing a large quantity of oxygene, and readily yielding it up to animal matter.

Proceeding on this principle, Citizen Alyon has procured several combinations of oxygene, which he has used as anti-syphilitics with the greatest success. It was on this principle that he thought of an ointment of oxygene, in preference to the blue mercurial ointment, and which produced the same effects. It was upon the same principle that he employed the super-oxygenated muriate of pot-ash, externally, to heal chancres and syphilitic ul-

cers; the effects of which were more expeditious, and more to be relied on, than any mercurial preparations hitherto known.

In the Military Hospital of St. Denis, he has repeated several experiments, which confirm the facts above stated. By augmenting the doses of the oxygenated ointment, he produced ptyalism, swelling of the tonsils, and that diarrhœa which results from mercurial friction pushed very far.

Among the cases reported by Citizen Alyon, we shall mention two, which seem to countenance his opinion, that oxygene acts more expeditiously and efficaciously than the preparations of mercury, which he considers merely as the vehicles of oxygene, when the treatment by friction is adopted.

A patient, 38 years old, had herpetic ulcers on his hands, legs, and on one of his cheeks. He was directed to use the bath three days. Citizen Alyon then ordered all the ulcerated parts to be rubbed two or three times with half a drachm of the oxygenated ointment;* they were cicatrized in eleven days, without the patient ever perceiving any effect from the metastasis which the topical anti-herpetic remedies, hitherto used, almost always produce. It cannot be supposed, says M. Alyon, that the oxygenated ointment acts like the repellent and astringent applications, as it relieves, by enchantment as it were, the sharp pains of the affected parts.

A soldier was affected with a large ulcer in the fauces, for which he had used a great many remedies at Beauvais, and, for forty days, had taken Van Swieten's solution without benefit. He touched the ulcer three times a day with the solution of the super-oxygenated muriate of pot-ash, and in seven days it was completely cicatrized.

* ℞ Axungiæ porcinæ purificatæ lbj.
Liquefiat leni igne, dein adde
Acidi Nitrici puri (32 graduum) ℥ ij.
Maſſam igni expoſitam tubo vitreo diligenter agita, donec ebullire ceperit, tunc ab igne remotam depone ut frigeſcat.
Uſus eximius in ulceribus ſyphiliticis, herpete et pſora.

CORRESPONDENCE.

To the Editors of the Medical Repoſitory.

GENTLEMEN,

THE 3d and 4th Numbers of the Medical Repoſitory have juſt come to hand. In the 3d Number, I find a review of an Inaugural Diſſertation on the Bilious Malignant Fever, &c. (p. 353.) Some of the opinions in this work you have controverted as erroneous. It would be happy for ſociety, and certainly honourable to the parties, if *all contention* were only from the deſire to diſcover, eſtabliſh and defend truth. This diſpoſition, certainly, ought more eſpecially to influence gentlemen in the profeſſion of medicine; the ſcience of which, it muſt be acknowledged, is yet much involved in the darkneſs of hypotheſis and conjecture. We arrive at certainty only through a long proceſs of deductive reaſoning, ſupported by facts and experiments, and confirmed by obſervation and long experience. Indeed, truth is no where beſtowed with unconditional profuſion: its acceſs to the mind is too often prevented by prejudice and paſſion. If we would poſſeſs it, it muſt be ſought after and cultivated with all the powers of human reaſon. To this end our exertions ſhould be *united;* but, if opinions are oppoſed, let the oppoſition be encouraged only with the hope, that the colliſion will excite and kindle into light the latent ſparks of truth.

What firſt meets your animadverſion, in the above-mentioned work, is the aſſertion, "that poiſons, operating upon the excitability or ſenſorial power of the conſtitution, can produce but *one action at a time; and when the conſtitution has experienced this action, it becomes no longer ſuſceptible of it afterwards.*" This aſſertion is ſaid to flow from "a haſty ſpirit of deciſion, and to be unqualified." I ſtated, (p. 7.) that it is a law with *moſt* of thoſe poiſons which produce their effects by a *critical fever*, that a conſtitution which has once gone through the action excited by them is no longer ſuſceptible of it; becauſe the poiſon is ſo powerful and active as to deſtroy the life of the part; or, that the conſtitution becomes habituated to the particular ſtimulus of the poiſon, and, therefore, upon a ſecond application to the part or parts of the ſyſtem, they are undiſturbed by, or are inſenſible to it.

You ſtate a caſe "where the human conſtitution was under the operation of mercurial ſalivation, intermittent fever, and ſyphilitic contagion, *all at once.*" That the human conſtitution can be affected *alternately* by ſyphilitic contagion, mercurial ſtimulus, and a fever paroxyſm, is not doubted; but not *all at once.* The excitability or ſenſorial power is a whole, or one and indiviſible, and is *totally* occupied by every individual and diſtinct impreſſion or ſtimulation; and it is as much impoſſible for it to be under two excitements *at once*, as it is to make *two* unities out of *one*—or as it would be for the mind to receive two ideas at the ſame time. Were it otherwiſe, I much doubt whether a ſingle diſeaſe could be cured. Is it not a true and a com-

mon maxim, that the leſſer pain is abſorbed or loſt in the greater? and are there not many applications of remedies upon this principle?

Your ſtrictures fall next upon the remark, that the more ſimple and homogeneous a ſubſtance is, the more powerful and active. "Is this the caſe," you aſk, "with carbone, ſulphur, or hydrogene? Are acids ſimple bodies? And is it to their ſimplicity and homogeneity theſe powerful ſubſtances owe their activity?" I only add, is caloric, or the matter of heat, a ſimple matter? and is there any thing more ſubtle and powerfully active in nature? "But of this enough." Yes, Sirs, quite enough to eſtabliſh the poſition beyond a doubt. It was not aſſerted that acids are ſimple bodies; but add a third or a fourth ſubſtance, water for inſtance, and they become at once more inert. To what purpoſe are the more critical and lengthy proceſſes in chemiſtry, but to ſimplify ſubſtances by ſtripping them of heterogeneous matters? Is a *caput mortuum leſs* or *more* active than ſublimate mercury?

Upon the aſſertion, that poiſons, miaſma, or morbific effluvia, are of too ſubtle a nature for chemical analyſis, and that their conſtituent materials are utterly unknown, you raiſe the following queries: "Are not the various combinations of quick-ſilver, lead, copper, arſenic, with oxygene and acids, very well underſtood? Do we not comprehend the conſtitution of carbonic acid gas? And are not the various animal exhalations compoſed of azote, charged with various degrees of oxygene, well underſtood, both ſynthetically and analytically?" My obſervations were confined to morbific poiſons, or ſuch as produce diſtinct diſeaſes in the human conſtitution. Mineral poiſons or their effects were not conſidered. All that I ever meant to affirm, you have allowed—"that the preciſe conſtitution of a number of them (morbid poiſons) is yet unknown."

You think me tinctured with ſentiments imbibed from Swedenborg's doctrine of influx. This I am not diſpoſed to deny. I think Swedenborg, ſo far as *I* comprehend him, to be a profound philoſopher and theologiſt. By this confeſſion, it is not expected to leſſen the prejudice imbibed againſt him, (for ſuch I muſt call it) or to add to his celebrity. It is what I owe to truth, and it flows from real conviction.

In the different works of this author may be found thoſe ideas and hints which the celebrated Dr. Darwin has wrought into a beautiful ſyſtem, and which will ſtand a monument of genius *ære perennius*. Certainly thoſe notions of Dr. Darwin which are fundamental of his work, very nearly coincide with thoſe that are to be met with in various parts of Swedenborg's writings. Thus *Darwin*, in his doctrine of ideas, which, perhaps, is the moſt ingenious part of his work, contends, and clearly proves, that "they conſiſt of motions or configurations of ſolid fibres, and that theſe are propagated to the ſenſorium or brain, and there become fixed. (See addition 5th, vol. iii. p. 312.)

Swedenborg. "There is no exiſtence, ſpiritual or natural, but in ſome form; all our thoughts and affections, or ideas, and the pleaſure or pain which they occaſion, are mere changes and variations of the ſubſtances of the brain or ſenſorium." Further: "All the viſcera of the body perform their functions entirely by the variations of the ſtate of their organic forms." (See the note ſubjoined to my Diſſertation, p. 47.)

Darwin—makes life to conſiſt in a ſeries of catenated fibrous motions, excited by ſenſorial power or external ſtimuli. His whole catalogue of diſeaſes is no more than certain derangements of theſe catenated motions. His diviſion of them is according to the different degrees of ſenſorial excitement, which, generally, he denominates, *irritation*, *ſenſation*, *volition*, and *aſſociation*.

He ſays, (vol. i. p. 17. ſec. 3.) "It is probable all our muſcular motions, as well thoſe that are voluntary as thoſe of the heart and glandular ſyſtem, were originally excited by the ſtimulus of ſomething external of the organ."

Darwin, vol. i. p. 20. "If you aſk what organs of ſenſe can be excited into motion, when you call up the ideas of wiſdom or benevolence? I aſk you by what organs of ſenſe you firſt became acquainted with theſe ideas? and the anſwer will be reciprocal; for it is certain that all our ideas were originally acquired by our organs of ſenſe; for whatever excites our perception muſt be external to the organ that perceives it, and we have no other inlets to knowledge but by our perceptions."

Swedenborg. "Love of wiſdom, or the thoughts, perceptions, and affections, are really and actually ſubſtance and form. Man has five ſenſes, viz. the feeling, taſte, ſmell, hearing and ſight. The ſubject of feeling is the ſkin with which man is encompaſſed; the ſubſtance and form itſelf of the ſkin cauſe it to feel what is applied; the ſenſe of feeling is not in the things which are applied, but it is the ſubſtance and form of the ſkin which is the ſubject; the ſenſe is only an *affection* thereof from things applied. It is the ſame with the other four ſenſes. Hence it follows that the ſight, hearing, ſmell, taſte, and feeling, are the *organs themſelves*, conſidered in their ſubſtance and form; and that whilſt they are *affected* the *ſenſe is produced*. It is the ſame with love and wiſdom, with this difference only, that the ſubſtances and forms, which are love and wiſdom, do not exiſt before the eyes as the organs of the external ſenſes; but ſtill no one can deny that thoſe things of wiſdom and love, which are thoughts, perceptions, and affections, are ſubſtances and forms, and that they are not volatile entities flowing from nothing, or abſtracted from that real and actual ſubſtance and form which is the ſubject: for there are, in the brain, innumerable ſubſtances and forms, in which every interior ſenſe, which hath relation to the underſtanding and will, reſides." (See Angelic Wiſdom concerning the Divine Love, part i. No. 41 and 42.)

Darwin again, vol. i. ſec. 1. "The WHOLE OF NATURE may be ſuppoſed to conſiſt of two eſſences or ſubſtances; one of which may be termed ſpirit and the other matter. The former of theſe poſſeſſes the power to commence or produce motion, and the latter to receive and communicate it."

Swedenborg. "All actuation of matter, primarily conſidered, is from a ſpiritual cauſe." Ibid.

Darwin, ſec. 11. "The living principle, or the ſpirit of animation, reſides throughout the body."

Swedenborg. "Life is in the *whole* and *every part* of the body." (See, as above, part v. No. 366.

Many more paſſages might be adduced from theſe authors, where there is a very cloſe agreement of ideas; but for this there is not room, neither could I do it readily, having read their works but once curſorily, and none of Swedenborg's philoſophical works. I ſhall only add one extract more, purpoſely to ſhow, that the boaſted diſcovery, ſo eagerly claimed by late medical philoſophers, that the blood is purified and nouriſhed by a congenial principle of the atmoſphere, the vital air, or oxygene gas, Swedenborg underſtood, and has clearly pointed out.

"*That the blood, while paſſing through the lungs, purifies itſelf from things indigeſted*, is evident, not only from the influent blood, which is venous, and, conſequently, replete with chyle collected from food and drink, but alſo from the diminiſhed quantity of blood returned into the left ventricle of the heart,

and alſo from the expirations which are humid, and from their being perceived by others from the ſmell.

" *That the blood from the air which is attracted nouriſheth itſelf with things conducible*, is evident from the immenſe abundance of odours and exhalations iſſuing continually from ſhrubberies, flower-gardens, and nurſeries of trees; and from the immenſe quantity of ſalts, of various kinds, iſſuing with waters from the earth, rivers, and lakes; and from the immenſe quantity of exhalations and effluvia from men and animals, with which the air is impregnated; that theſe flow into the lungs with the air which is attracted, cannot be denied, and as this cannot be denied, neither can it be denied that the blood attracts therefrom ſuch things as are conducible to it: Hence it is that the blood returned into the left ventricle of the heart is *changed into arterial blood, and becomes florid*, (niteat.) Theſe conſiderations prove that the blood purifies itſelf from things heterogeneous, and nouriſheth itſelf with things homogeneous." (The ſame work as above-mentioned, part v. No. 420.)

The above I hand you for publication, ſhould it receive your approbation. —Of your work, permit me to ſay, that it is held in much eſtimation by thoſe who have peruſed it. They conſider it as greatly uſeful and highly honourable as an American publication, and feel intereſted in giving it currency. I have added one to the liſt of ſubſcribers. Wiſhing your arduous undertaking that ſucceſs and encouragement which it certainly merits, from the ability, candour and judgment with which it is conducted, I am, gentlemen, with much reſpect and eſteem, your humble ſervant,

SAMUEL BROWN.

Boſton, May 28, 1798.

THE

MEDICAL REPOSITORY.

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1798.

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ADVERTISEMENT.

THE long delay of this number has arisen from causes which must be obvious to every reader. The derangement and suspension of the printing, during the late epidemic, rendered it necessary to execute the principal part of the work a considerable time after the period at which it ought, according to the order prescribed, to have been ready for publication. The pressure of so great a calamity will doubtless induce the friends and patrons of the Repository indulgently to consider this inevitable deviation from the punctuality hitherto observed, with little exception.

The resumption of our editorial duties, since the extinguishment of the epidemic, has served at every step powerfully to recal our sympathy for the loss sustained by this work in the death of our excellent colleague and friend Dr. SMITH. The weight of this loss will be duly appreciated by all those who honour the REPOSITORY with their perusal.

Instead of sinking, however, under the weight of a misfortune in which the whole medical world have reason to participate, the surviving Editors find themselves impelled, by the most cogent motives, to redouble their exertions in supporting and improving this publication: And they pledge themselves to the public to spare no labour or pains to deserve a continuance and extension of that patronage which has hitherto fostered the undertaking, and greatly exceeded their expectations.

The situation of the United States, in relation to the recurrence of the malignant epidemic which has proved so fatal for some years past, is critical and alarming. It is to be hoped every exertion will be made to collect the information upon which public opinion is ultimately to be formed, and the proper measures adopted for guarding against the return of the disease. In conducting this work, nothing can give the Editors more satisfaction

than to be instrumental in assisting and promoting this great object of public safety; and they respectfully request readers of every description, who have had opportunities to observe the origin, phenomena and causes of pestilential diseases, to collect and arrange all such facts as may be deemed interesting, and, when more eligible channels of publication do not present, to suffer them to be laid before the public through the medium of the *Medical Repository*.

Communications designed for this work, may be addressed (post paid) to either of the subscribers,

SAMUEL L. MITCHILL, *Columbia College.*
EDWARD MILLER, No. 158 *Broadway.*

New-York, December 15, 1798.

N. B. In order to facilitate conveyance, and to save expence, persons wishing to transmit communications for the Medical Repository from distant parts of the United States, may send them, if deemed more convenient, addressed to the care of T. and J. Swords, No. 99 Pearl-street, New-York; E. Larkin, Boston; T. Dobson, Philadelphia; A. Hannah, Norfolk, Virginia; Freneau and Paine, Charleston, South-Carolina; and Seymour and Woolhopter, Savannah, Georgia.

The following errors have passed in some of the copies of this Number:

Page 163, line 8 of Dr. Priestley's letter, for "atmosphere" read *atmospheric.*
165, line 17, for "absorbed" read *ascribed.*
—, in the last line of the last paragraph but one, before the word "may" insert *air.*
167, line 8, for "*ponderera*" read *ponderosa.*

MEDICAL REPOSITORY.

VOL. II.—No. II.

ARTICLE I.

On the febrifuge Virtues of LIME, MAGNESIA *and* ALKALINE SALTS *in Dysentery, Yellow-Fever and Scarlatina Anginosa. In a Letter from Dr.* JEREMIAH BARKER, *of Portland, (Maine) dated May* 30, 1798.

I HAVE perused your letter to Dr. Percival with particular attention, as well as the other books, and acknowledge myself to be furnished with many new as well as very important ideas. Several of my brethren have also read them, and are persuaded of the truth of the doctrine. But there are some among us who still consider the phenomena of fever to depend upon a redundant quantity or acrid quality of the bile. Therefore their views are chiefly directed to emptying the intestines of this *mischievous liquor*, as they term it. Of what importance is it then that "medical prejudices should be combated, and a new order of things established?" "If Professor Mitchill should succeed in discovering the quality of contagion," says a learned member of the Massachusetts Medical and Philosophical Society, in a letter of May, 1797, "it might occasion a great revolution in the practice of medicine."

For nine months past epidemic fevers have been very prevalent in this northern climate, lat. 43° 43′, and attended with considerable mortality. Having been pretty constantly engaged in practice, I have had an opportunity of making accurate observations, and have been very particular in noting them.

A general account of these distempers, as they have appeared among us, together with the mode of practice which has been pursued, I presume, may not be unacceptable.

The weather during the month of July last was very dry and sultry. The month of August was remarkably wet and drizzly; the grain much damaged by mildew and rust.

From the middle of August to the first of October an epidemic fever, attended with dysentery, was very prevalent in several towns. Adults were more generally seized with it than children.

The disease was ushered in with pain in the abdomen, frequent stools, nausea or vomiting, chilliness succeeded by heat, and great prostration of strength. The stools were deeply tinged with blood, and very fœtid. The matter rejected from the stomach was of a dark green colour; its taste described to be like that of tartar emetic. A considerable fever and thirst constantly attended. The pulse was quick and weak, though, during the exacerbation, which happened about once in twelve hours, large and full. The violence of the disease continued from one to two weeks, according to means used for its melioration. Thirty severe cases, besides several gentle ones, fell to my share. I lost only one adult, to whom I was called at a late period, and two children, where very little medicine could be administered. The mode of practice which I pursued was to cleanse the stomach with ipecac. and the intestines with rhei and sal. absynth. or sal. cathar. with sal. absynth. Lubricous oils and mucilages were occasionally employed, as also enemas. But the remedies which I depended upon to counteract the noxious cause, were alkaline salts and earths. My common prescription was aq. calc. ℔j. sal. absynth. ʒ ij. the dose from one to two ounces every hour, and in some cases every half hour, or oftener, in an infusion of flor. chamœm. Besides this I used testa. magnes. or creta, frequently from one to two ounces in twenty-four hours. Calcined oyster-shells were sometimes employed, from ℈ j. to ʒ i. the dose.

The adult fatal case was a woman of twenty, ten days advanced in the disease before alkalines were employed. The other remedies had been duly administered, together with opiates, but to no apparent benefit. For three days she had rejected every thing from her stomach that was taken, together with dark green bile. The stools resembled grumous blood, and were *remarkably* fœtid. The pain in her bowels, with a sense of heat, was very distressing; thirst for water intense. A table-spoonful of the alkaline solution was then given once in a quarter of an hour, and the vomiting readily ceased. She requested it oftener, without any additional mixture, saying that it was very grateful to her stomach, and served to remove that disagreeable taste from the mouth and throat. The stools also abated in frequency, and assumed a more natural colour; but, to the astonishment of her nurse, the fœtor was almost entirely removed in less than eighteen hours. The next day, being in every respect apparently better, she asked for food, which she had not done before since the attack. She was indulged freely by her nurse, and the medicine omitted, supposing it had done its office, and food only indicated. She failed the day following, under oppression about the precordia and cold sweats.

I had many other cases very similar, and equally alarming, but had the happiness to see them all recover, under a liberal use of alkaline remedies, confining the patient chiefly to a diet of boiled rice and Indian gruel. I had an opportunity of observing that where wine, cinnamon, or other cordials were disrelished and nauseating, which was generally the case, pure lime-water was not only congenial to the stomach, but peculiarly grateful to the taste. I found that an aqueous solution of alkaline salts was equally congenial to the stomach. These articles evidently abated that sense of heat in the stomach, and thirst for water, so generally complained of.

During the month of October the epidemic fever continued to prevail, unattended with dysentery. The symptoms in other respects were not dissimilar, excepting that some were attended with a deep yellow skin, and all with more or less pain in the head and back.

Five of my patients, with a yellow skin, resided in a country village, near a fresh river, on low marshy ground, seven miles from Portland, so that no suspicion was entertained of the disease being imported. Several other cases of yellow-fever occurred in different parts of the country. A woman, seven months advanced in pregnancy, was attacked with this species of fever. I was called the sixth day. She lay in a comatose state, and could not be roused. The skin was of a deep yellow colour, though her face was suffused with redness; the pulse was full, and the bowels constipated. She was attacked, as I was informed, with nausea and vomiting, pain in the head and faintness. I took away eight ounces of blood, and gave a cathartic, which did not operate. The next day an abortion took place, and she died a few hours after.

Another woman was attacked in a very similar manner in her ninth month. She was delivered in the midst of her fever, and recovered upon the alkaline plan. All the other patients also recovered that were attended with yellowness, excepting the case first mentioned, and alkaline remedies evidently afforded the most relief. They would actually alleviate the distressing pain and anguish at the stomach, which would not yield to opiates. The morbid excitement, too, was *evidently* under the controul of alkalines; the febrile disturbance appearing to be in a direct *ratio* to the degree of virulence in the delcterious cause.

This fever generally subsided in ten or twelve days, where alkaline remedies were employed; but where they were not used, it was frequently protracted to twenty, and sometimes thirty or more days, and then they seldom recovered.

A merchant in the country village above mentioned was attacked with the prevailing fever, though his skin was not yellow.

Due attention was paid to him in the usual way, for alkalines were considered, by his friends, as dangerous articles. He continued thirty-six days, and died highly putrid. His nurse, before he died, was attacked with the fever, and expired on the twentieth; livid spots appearing upon her body immediately after death.

A servant man was also attacked with similar complaints, and died on the eighteenth, under similar treatment.

Immediately after the death of the nurse, who was removed to her father's family, in the neighbourhood, consisting of eight children from eighteen to six years old, three of these were attacked with the prevailing fever. Alkaline remedies were employed in these cases, though at a late period of the disease, when two were judged to be hopeless; but they happily recovered. The other five were then attacked in a similar manner. Their symptoms, at the onset, were truly alarming; they all, however, recovered under a liberal use of alkaline remedies, with very few medicines of any other kind.

Vomiting of green matter, with an occasional diarrhœa, were the most troublesome symptoms in the case of the nurse, which could not be mitigated by evacuants or tonics; but all the symptoms of disturbance in the others gradually subsided after the first week, without any evident symptoms of putrescency taking place. The recovery of these patients served, more fully, to establish the credit of a mode of practice, which had been judged by some to border upon rashness, viz. exhibiting alkaline salts and lime-water in fevers.* During the months of November, December, January, February, and March, the fever, which still continued, was attended, in most cases, with a scarlet efflorescence and sore throat. It prevailed in almost every town in the county, and was mortal in many instances.

The disease was ushered in with the usual symptoms of nausea or vomiting, chilly fits, succeeded by heat, &c. The throat soon became inflamed, which, in a short time, put on a gangrenous hue, and the breath was very fœtid. In some cases the throat was swelled to such a degree, both externally and internally, that deglutition and speech were almost entirely prevented; but there was no uniformity in the symptoms. In some there was no sore throat or eruption. In three cases, which I saw, the virus was turned upon the renal glands, producing bloody urine, mixed with skinny filaments, attended with great pain, heat and anguish. In others there was distressing pain in the bowels and thirst for water.

* The saline mixture and spt. mind. have ever been considered as safe and efficacious medicines in fevers; but we never suspected their efficacy depended upon any alkaline power that was exerted after saturation, and our ignorance in this respect, I presume, is not very singular.

After cleansing the stomach and intestines, my efforts were particularly directed to counteract the virus or noxious cause. To effectuate this important purpose, alkaline remedies were liberally employed, and their good effects were very apparent.

Besides these, oils and mucilages were used to advantage. The mouth and throat, when particularly affected, were gargled with lime-water. This was evidently beneficial. It was as congenial to the ulcers and sores as it is to ulcerations upon the external surface. Epispastics were applied to the neck, with a view to unload the glands of accumulated poison. The blisters produced a great discharge, and were very sore, attended, in many instances, with intolerable itching. A lotion of lime-water readily allayed this itching, and disposed the sores to heal, which, in some cases, appeared gangrenous.

I was called to two cases which terminated fatally. These were all that I lost out of more than fifty in this distemper.

In one of the fatal cases, a girl of twelve, to whom I was called the sixth day, the throat was gangrenous; the arm also became gangrenous where an epispastic had been applied; the breath was extremely fœtid, and her speech and swallowing were in a great measure prevented. She died the twelfth. The other, a child of four, complained of a distressing pain in the bowels, and was very thirsty. The efflorescence, which had been slight, readily disappeared, and the throat was not affected.

Warm stimulating teas, evacuants and tonics, particularly opiates, had been given, but no ease could be procured. I saw her on the eighth day, and she died the ninth. Upon dissection, the inside of the stomach was found red and inflamed; the texture of the villous membrane destroyed, grumous blood appearing in its stead. A black liquor was also contained in the stomach, which was in a contracted state. No marks of inflammation appeared in the intestines; they contained a yellowish fluid, and were distended with air. The omentum was considerably wasted, and of a red colour. No other morbid affection could be discovered.

Another child in the family, a girl of six, was, soon after, attacked in a similar manner. I was called the fourth day, when the efflorescence, which was partial and light, had vanished. The pain and anguish in her bowels appeared, by the complaints, equally distressing, and her thirst for water was great. After gently cleansing the stomach and intestines, the alkaline solution soon alleviated her distress, and, contrary to my expectation, she recovered.

I dissected a woman, some years since, who died of a puerperal fever, and found the stomach in a very similar condition with the child inspected. I saw another puerperal case dissected, where the rectum was also corroded and partly destroyed. I then accu-

ed the bile of being the mischievous cause; but I now believe that the ravages made in the stomach, intestines, throat, or other parts, must be imputed to the *septic acid;* and am fully persuaded that a seasonable and liberal use of *alkalines*, in all these different species of fever, are especially indicated. Indeed, I conceive of no other medicines that can, with any measurable degree of propriety, be denominated *febrifuges*.

For nearly three years I have pursued this mode of practice in febrile diseases, and have kept exact records of cases; from which it appears that I have not lost a single patient, where these remedies have been particularly employed from the commencement of the fever.

I found that opium and spirits could be borne only in very small quantities in these fevers, especially in the first stage; and when the morbid excitement was considerable, they were evidently injurious. Wine was offensive to most stomachs; and the bark was by no means congenial. Mild bitters in decoction were generally agreeable. Rice and Indian gruel were the most grateful articles of diet.

I hope, before long, to assume confidence enough to publish a particular account of these febrile distempers, as they have appeared among us for a few years past, together with such observations as appear to me of public utility; and if it should, in any measure, contribute to promote the art of healing, I presume you would be compensated for your friendly assistance.

With sentiments of great esteem and respect,

I am, dear Sir,

Your much obliged humble servant,

JEREMIAH BARKER.

Dr. S. L. MITCHILL.

ARTICLE II.

An Account of the PESTILENTIAL FEVER *which prevailed at Wilmington, North-Carolina, in* 1796; *in a Letter to Dr.* MILLER.

By A. J. DE ROSSET, *M. D.*

I REGRET that it is not in my power to furnish you with as accurate an account as I could wish of the epidemic of 1796, not having kept any record of the disease, or any diary of the weather; neither have I been able to procure them from any of my medical friends. To shew, however, my readiness to comply with your request, I will endeavour to supply those deficiencies from memory.

The spring and early part of the summer of that year had been remarkably wet, scarce a day having passed for several weeks without rain. About the middle of the summer the weather became dry, and unusually warm. In July the dysentery appeared, and soon became very general, proving fatal in many instances. Toward the close of August, when the first cases of the bilious fever occurred to me, the dysentery began to decline; and scarcely one new case of it occurred after the fever became more prevalent. It may be here remarked, that every person who had laboured under the dysentery, without an exception, within my knowledge, escaped the fever. No age, sex, or colour was exempt from its attack. On or about the 20th of September, succeeding several very warm days, we had one day so cold that a surtout was to me a comfortable addition to my clothing. On that day more persons were taken ill than on any two other days during the sickness.

The symptoms which ushered in this disease were chilliness and rigor, alternating with a sense of heat; pains in the head, back, loins, and extremities; faintness and vertigo; difficult respiration, with a tightness across the chest; oppression at the præcordia; a pain in the hypochondria and region of the stomach, which scarcely admitted the slightest pressure; anxiety and depression of spirits: early in the disease the neck and face were flushed; heat and redness of the eyes: after a few days continuance, the eyes and skin became yellow, observable first upon the upper part of the breast; the pulse, in most instances, quick and full, though not hard, becoming in two or three days small and weak. In several cases, the pulse, in a couple of days from the attack, became perfectly regular, both with respect to strength and fre-

quency, and differed nothing that I could discover from its healthy standard, while the other symptoms continued as before, or were aggravated; so that the danger of the patient was not indicated by the state of the circulation. These cases terminated fatally. Nausea and retchings to vomit were almost inseparable from this fever; sometimes nothing was discharged by these efforts, but generally a yellow bile, changing by degrees to a greasy looking green water, which was, however, often thrown up without any conatus, but by a kind of gulping, or involuntary eructation: ultimately the true black vomit, as described by writers on the yellow fever, came on. A number of other symptoms, by no means peculiar to this epidemic, took place; such as great thirst, dry parched tongue, dry skin, paucity of urine, and that apparently much coloured with bile, bound belly, &c.

The opinions of people here have differed as much relative to the origin of this fever, as those of the Philadelphians, respecting their epidemic of 1793. I have, however, no doubt in my own mind of its having originated among us; nay more, of its differing from our common autumnal bilious remittent but in degree, of its originating from the same causes, and being aggravated by the circumstance of season. The situation of our town, exposing much to the operation of marsh miasmata, the state of the weather which preceded and accompanied the disease, our not being able to trace it to any other source, all tend to a confirmation of this opinion. I did not observe one unequivocal instance of its being communicated by contagion, nor do I believe that with us it was so; though I have no doubt that diseases originating from miasmata may become highly contagious, from particular circumstances. A few cases every year of our common fall fever, take on all the symptoms of a violent yellow fever; and, in the year 1796, many cases of the epidemic were without those symptoms which peculiarly characterize it, and differed in nothing from the common autumnal fever.

With respect to the remedies used in this disease, I shall only mention those differences from the common practice which were rendered necessary by the circumstances of the disease. Bloodletting, from the sudden prostration of strength which succeeded it, we could not make use of as a general remedy: nor durst I venture upon the use of antimony, or indeed any emetic, from the very irritable state of the stomach: many to whom medicines of this kind had been exhibited, without professional advice, vomited incessantly till they died. I generally endeavoured to evacuate the bowels freely, by the use of purges, assisting their operation by glisters; after which, without waiting for an intermission, I attempted the use of some light preparation of the bark, which, when it could be retained, seldom failed proving service-

able. If a moisture on the skin was the consequence of its exhibition, I considered my patient safe. In the early stage of the disease, bark and opium, even where they did not aggravate the symptoms, were productive of no advantage. With a view to procure remissions, the common febrifuge saline draughts and mixtures were prescribed, and were sometimes serviceable, as well as the various acidulous and small drinks usually furnished the sick in such cases.

Thus, Sir, I have, as far as I am able, given you an account of the disease which you requested, and hope no material information has escaped me. You will be good enough to make every allowance which may be necessary, and remember that I have written solely from memory.

I am, with much esteem and respect,
Yours,

A. J. DE ROSSET.

P. S. The number of deaths, including those from the dysentery, amounted, in that year, from the beginning of August to the beginning of November, to about one hundred and fifty persons of all descriptions. The 25th and 26th days of September were more fatal than any others. On one of those days as many as fourteen funerals were counted—A very large number for a small place not containing more than one hundred and twenty, or one hundred and thirty families.

ARTICLE III.

On the ill Effects of Blood-letting in PUTRID BILIOUS FEVERS *and* PNEUMONIA TYPHOIDES, *as they appear in North-Carolina; in a Letter to Dr.* DAVID HOSACK.

By HUGH WILLIAMSON, *M. D. &c.*

SIR,

EXERCISED as I have been for many years in public employments, and desirous to supply by industry, what might be wanting in talents, I have devoted little time, as you may believe, to medical studies. In the mean while, the diseases that are most fatal in Carolina, have not failed to claim some share of my attention; but the few cases that have accidentally come under my notice, have not enabled me to determine what is the best method of treating them, much less can I say, whether the lancet is successfully used in treating the Yellow Fever; for I have not seen a single instance of the complaint that is properly so called in North-Carolina. The fevers with us, of a bilious origin, that are most fatal, do not commonly appear in the warmest season. Those fevers, as I conceive, are not removed by a liberal use of the lancet.

Bilious intermitting fevers are very prevalent during the autumn, in the level country near the sea coast. They also prevail near the rivers, for some distance above the low lands. Those fevers are seldom fatal except to strangers who have a tense fibre, or who are careless. Those intermitting fevers disappear as the cold weather sets in; but they are frequently succeeded by fevers of a different type that are more fatal. Those fevers of the colder season, are commonly attended by symptoms of partial inflammation, whence they are denominated *pleurisies of the eye or the head;* at other times they affect the side. In those several forms they are equally dangerous. As those symptoms of pain are attended with a considerable, often with a high degree of fever, the general practice has been to bleed once and again; but the patients, by far the greater part of them, as I conceive, sink under the disease.

From a detail of circumstances, I have been induced to believe that the fever mentioned is of the putrid kind. It commonly attacks people who have been afflicted by intermitting fevers, during the summer and autumn. It appears chiefly, perhaps only, in those

places where people are subject to intermitting fevers, in low sunken grounds, and along the sides of rivers. In the beginning of the winter, in the year 1792, that fever was very fatal in Martin County, near the river Roanoke; the river had lately been very low, and much of the muddy bottom, and other grounds usually covered by water, had been exposed to the sun. The pain was then in the head. In the year 1794, ten or twelve men, the heads of families, adjoining one another, died of that complaint in December, on the river Neus. They had lived near the beginning of the high grounds on the north-east side of the river. There had been a dry season, and the winds commonly at south-west. The other inhabitants of the adjacent country, except on that narrow strip by the river, enjoyed good health.

In the year 1792, to the best of my recollection, in the beginning of winter, this pleurisy in the head, as it was called, was endemic near Matamusket, in a settlement where the land is rich but very low, and much of it covered with water. There was only one practitioner in physic in the settlement, and he was a mere empirick. We have little intercourse with people in that settlement, for they are surrounded by an impenetrable dismal, or a broad sound. Inquiring of a planter from that settlement concerning their population and general state of health, he told me that thirty or forty of the inhabitants had died on the foregoing winter of a *pleurisy in the head*. Have you no Doctor? Yes, said he, we have one. Did he not bleed his patients? He bled them frequently. Did any of these patients die? They all died. Did not you try in that case to do without the Doctor? Yes, said he, we left off sending for the Doctor; we drank our own teas, and people recovered.

I had been told by a very respectable Physician, that he was called, in the course of his practice, to see a Negro, in Jamaica, sick of a pleurisy. He had a sharp pain in the side, attended with a fever. The patient was bled, and died in two days. He was soon called to see two or three other slaves on the same estate ill of the same complaint. He ordered them to be bled, and they all died. Alarmed by this unexpected issue of his practice, he began to look for the cause of a complaint that eluded the lancet, and he discovered a pond of stagnant water to the windward of the huts of the Negroes. The lancet was thrown aside, and, by the plentiful use of cordials, the sickness among those people was removed.

Facts of this kind have tended to establish the opinion I have mentioned concerning the fever that is commonly so fatal in North-Carolina.

Two cases only have occurred in which I had an opportunity of comparing this theory with the corresponding practice.

While the assembly was sitting at Raleigh, in January, 1795, one of the members, who lodged at my quarters, was taken sick of a fever and pain in the side. One of the members had lately died of a similar complaint in three or four days illness; and the persons above mentioned on the river Neus, at no great distance, had died on the last month of a pain that was also in the side. The member last taken ill was from the Pais Bas, and had been sickly in the autumn. The Doctor who was called requested my advice. I advised him to keep the lancet in his pocket; but as the patient complained of a head-ache, a full pulse, and redness in his eyes, a moderate dose of castor oil was administered. The operation was moderate; but the consequent loss of strength in the patient, and depression in his pulse, was more than I had expected. A blister was put on his legs. He drank wine whey plentifully, and took an infusion of serp. virg. and cort. peruv. not very liberally, for he preferred the whey or the wine. He recovered.

A gentleman of my acquaintance at Edenton, was seized that winter of the same fever. Sundry persons in that town, or its vicinity, had lately died of it. They had been bled as for the common pleurisy, an inflammatory disease. The pain on that winter uniformly affected the side. The gentleman to whom I refer was taken ill in the night: he was bled by a Doctor who was called early in the morning. I saw him before ten, and advised to abstain from the further use of the lancet. The patient was a strong man; but he also had been afflicted in the autumn by an intermitting fever. I wished to see a remission of the fever before the bark was administered. A sufficient perspiration was easily excited. He was twice blistered. He drank wine whey plentifully and snake-root tea. On the fourth or fifth day he discharged a little blood, mixed with phlegm, from his lungs. Passing that appearance to the account of a dissolved state of the fluids, I did not hesitate to advise a plentiful use of a cold infusion of the bark. He recovered. I did not hear, to my recollection, a single case that winter of a patient recovering who had been freely bled.

As the patients who suffer by the complaint are commonly men, not often women, and as men expose themselves much more imprudently than women to the cold and to the rain, there is reason to believe that a checked perspiration is the proximate cause of the complaint. Any fever, thus induced, where the fluids are dissolved, and in such a state of the atmosphere as has been mentioned, must soon be expected to put on a dangerous appearance. I have known a man, thus prepared by intermittents, in the season and country mentioned, bring on, by dancing, what was called a pleurisy in his head, and die in forty-eight hours.

I was assured by Dr. Sawyer, a Physician in Pasquetank, about thirty miles from Edenton, that he was called to many patients on the winter of which I have last been speaking. They complained of a pain in the side and a high fever. He seldom waited, as he declared, even for a remission: he gave the bark in substance, and his patients recovered. Having business in Pasquetank, I inquired concerning the general progress of that fever during that sickly season. I was assured, by a gentleman there, whom Dr. Sawyer had attended, that having a high fever and considerable pain, he took the bark in substance, and thought that his fever moderated by every dose. He said that one of his slaves had been treated in the same manner with a similar effect. He added, that another Physician in the same vicinity, a man of talents, and well educated, adhering to the bleeding system while the pain and fever remained, had lost the most of his patients.

Whatever success may have attended the practice mentioned, I think the indiscriminate and immediate use of the bark must be exceptionable and hazardous. I am, nevertheless, persuaded, by all the observations I have made on this subject, that the lancet should seldom be used in the brumal fevers, that often appear in the low country in Carolina; but it is a remedy commonly at hand; it promises immediate relief to a person in pain. These circumstances appear to have kept it too long in use.

Be pleased to accept the assurance of my sincere respect.

HUGH WILLIAMSON.

New-York, August 25th, 1797.

ARTICLE IV.

Singular Termination of an OMENTAL HERNIA; *communicated in a Letter to Dr.* MITCHILL, *by Dr.* JAMES STRATTON, *of Swedesburgh, New-Jersey, dated July* 2, 1798.

ON the 26th of April, 1795, W. C. of the county of Salem, in New-Jersey, aged 45, of a firm constitution, was attacked with a violent cholic. On the 28th his bowels were freely opened, and some relief was obtained by injections. 30th. The bowels continued open, but very uneasy; a hickup, or a kind of belching, was observed, which frequently brought up a part of the contents of the stomach. On inquiry a tumor was found in the right groin, of about the size of two fingers, owing to the protrusion of a portion of the omentum, through the ring in the abdominal muscles, forming an omental hernia. After plentiful bleeding, attempts were made to reduce the protruded part, but without effect, the tumor being hard and very tender. Cold saturnine applications were then industriously employed and continued for several days; during which time the attempts at reduction were repeated with no better success. The patient having refused, after repeated solicitations, to submit to any operation, remained in nearly the same state until about the 10th of May, being two weeks from the attack, when the tumor subsided, and became soft, insensible, and crepitous; at the same time some appearance of tumor was observed in the most depending part of the scrotum, accompanied with pain. This increased rapidly until the 14th, when the tumor, having attained the size of a man's head, burst, pouring out a quantity of pus, mixed with fœtid sanies. The strangulated and sphacelated parts of the omentum having been separated from the sound, after destroying the hernial sac, had fallen down into the scrotum, producing inflammation and suppuration sufficient to effect their discharge. The abscess, in a few days began to heal, and, by simple dressings only, the patient recovered, and is now living, without experiencing any inconvenience from what has happened.

ARTICLE V.

Professor MACLEAN *against the* DOCTRINE *of* PHLOGISTON; *in a Letter to Dr.* MITCHILL, *dated College of New-Jersey, 16th July, 1798.*

MY DEAR SIR,

I RECEIVED yours enclosing the printed letter, which, at Dr. Priestley's desire, you forwarded to me.

It was my intention to have answered the second part of his Observations on the Doctrine of Phlogiston, &c. before now, but I have been otherwise more agreeably, and, I hope, more usefully employed; however, he will hear from me as soon as I can find leisure.

The experiment with the zinc does not seem to be of more consequence than that with the iron, and admits of an easy explanation on antiphlogistic principles.

The flowers or white oxyd, was formed by the union of the oxygen in the atmospheric air with the zinc. The inflammable air or hydrogene gas, and the black powder, proceeded from the decomposition of the water dissolved in the air, and the oxydation of the zinc: while the oxygene of the water formed with the zinc the blackish oxyd, the hydrogene was evolved in the state of gas.

Blackish oxyd of zinc contains less oxygene than the white oxyd, and its being formed in preference during the decomposition of the water, is a proof that zinc, like many other bodies, combines with different proportions of the same substance, with unequal force. It is so much disposed to unite with the quantity of oxygene necessary for the formation of the blackish oxyd, that it decomposed the water to obtain it; but, under the circumstances in which the experiment was made, it could not separate from the hydrogene, a sufficiency to become the white oxyd.

When the black powder or oxyd was heated in confined air, the addition necessary to form the white oxyd was afforded without the opposition of any force sufficient to prevent its union. And it was from this union taking place, that the black powder became white, and the acid was diminished and rendered less pure.

The black powder yielding no oxygene when heated, is no proof that it contained none; even the white oxyd, which the Doctor allows to contain the pure part of the atmosphere or oxygene, does not afford it when exposed to the same temperature.

to which the black powder was submitted; nay, I have never heard of its parting with oxygene at any temperature.

This subject I will consider more particularly again; but, in the mean time, I wish Dr. Priestley would attend to an experiment mentioned in page 301 of the 1st vol. of his Experiments and Observations. There we are told he got flowers or white oxyd of zinc, and inflammable air or hydrogene gas, by passing the steam of water over red hot zinc. I have not repeated this experiment, but if he has been accurate, it will, if taken in connection with the one related in his letter, be destruction to his hypothesis.

The oxygene in the white oxyd must have been furnished by the water, for steam and zinc were the only substances employed. The hydrogene also must have come from the water, for the formation of the flowers or white oxyd, in other circumstances, is not attended with an evolution of hydrogene gas—as for instance, when it is formed in atmospherical air, then, as the Doctor says, "the pure part of it, (oxygene) no doubt, enters the calx (oxyd), "while the phlogisticated part (azote) remains unaffected." Thus you see his experiments tend to prove that water is composed of hydrogene and oxygene, and if it be the case, the antiphlogistic doctrine is, I believe, incontestible.

I am, with much esteem,

Yours sincerely,

JOHN MACLEAN.

ARTICLE VI.

Dr. PRIESTLEY *on* RED PRECIPITATE *of* MERCURY, *as favourable to the* DOCTRINE *of* PHLOGISTON; *in a Letter to Dr.* MITCHILL, *dated Northumberland, July* 20, 1798.

DEAR SIR,

THOUGH I have not yet heard of the receipt of my last to you of June 14th, relating to an experiment with *zinc*, I take the liberty to send you an account of another with *red precipitate*, which I think favourable to the doctrine of phlogiston.

The most plausible of the arguments against the existence of phlogiston, as a necessary component part of a metal, is drawn from the phenomena of the calcination and revivification of mercury. This metal, exposed to the atmospheric air in a certain degree of heat, is augmented in weight, and becomes a calx, called *precipitate per se*, and in the new nomenclature, *an oxyd of mercury*. The additional weight which it has hereby acquired is from the purest air, which it gives out when it is exposed to a greater degree of heat. As this is done in glass vessels, it has been concluded that, though air was expelled from this calx, nothing entered to supply its place. This calx, it was therefore said, becomes a metal without phlogiston, and that from analogy, other calces may do the same.

The fact is acknowledged, and the conclusion would be readily admitted, did not other facts seem to authorize a different inference. For though this calx of mercury can be revived in close vessels, yet when it is revived in contact with inflammable air, this air is imbibed by it; and there is another calx of mercury, viz. that made by the vitriolic acid, which cannot be revived by mere heat. To reconcile these appearances, I have said that mercury may become a calx without parting with any of its phlogiston. Many other calces are not free from it, though they do not retain enough to give them a metallic form; and mercury, like iron, may contain more or less phlogiston without losing its metallic properties.

This, however, has not been deemed satisfactory; and with respect to the seeming absorption of the inflammable air in which the calx of mercury is revived, it is said that the pure air emitted by the calx uniting with the inflammable air, forms *water*. But, besides that no sufficient quantity of water is found when this process is made over mercury, experiments which I have made since my last publication on the subject, prove that neither water,

nor any other substance is formed by it; and also, that the quantity of inflammable air actually absorbed is so great, as to render it highly improbable that it can ever be revived without it, or the phlogiston, which is the principal ingredient in its composition.

By means of a burning lens, I heated a quantity of red precipitate in inflammable air, in a glass vessel confined by water, till one hundred and one ounce measures were reduced to ninety-five. Then, examining the residuum, I found that one measure of it mixed with an equal quantity of nitrous air occupied the space of 1.77 measures. Computing from this it will be found that it contained a quantity of pure air equal to 7.22 ounce measures, which added to the 26 which had disappeared, make 33.22 ounce measures of inflammable air which had been decomposed and absorbed by the calx in its revivification. For that the air expelled from the calx had not formed water, was evident from its being mixed with the remainder of the inflammable air, and there was no sensible quantity of fixed air in it; though I find in my register of experiments, that I have sometimes found it in this process; nor can this difference in the result be thought extraordinary, when it is considered that fixed air certainly consists of pure air and inflammable air, and that it is found in other processes similar to this.

In another experiment of this kind, I revived a quantity of the precipitate in thirty ounce measures of inflammable air, till twelve ounce measures disappeared, and the standard of the remainder, examined as in the former case, was 1.75. From this it appeared that 1.495 ounce measures of air had been expelled from the calx, and that 13.495 ounce measures of inflammable air had been imbibed by it.

As a good deal of the calx was sublimed in this process, the best method of ascertaining how much inflammable air is imbibed in the revivification of a given quantity of mercury, is to compare the quantity of pure air that is yielded by a given quantity of the calx, with the quantity of inflammable air that corresponds to it in these experiments. Now an ounce of precipitate yields about sixty ounce measures of pure air; and since in these experiments, 46.71 ounce measures of inflammable air were absorbed when 8.71 ounce measures of pure air were emitted, sixty ounce measures could not be expelled without the absorption of 322 ounce measures of inflammable air; and since mercury gains, as Mr. Chaptal says, about eight per cent. in being converted into precipitate, an ounce of mercury must contain 362 ounce measures of inflammable air, or rather the phlogiston that enters into it. An ounce of lead, I have shewn, requires 108 ounce measures of inflammable air, an ounce of bismuth 185, of tin 377, of copper from verditer 403, and of iron 890. How much is contained in silver or gold I could not ascertain in that method.

That mercury revived either by means of inflammable air, or in close vessels, has the same properties, will not be denied; and if so, it must consist of the same principles, and in the same proportions, or nearly so. I am therefore inclined to think, improbable as it may appear, that the same principle which is essential to the constitution of inflammable air, i. e. phlogiston, passes from the fewel through the glass. There is, however, only the choice of this difficulty, and that of an ounce of mercury containing either 362 ounce measures of inflammable air, (that is the phlogiston in it) or none at all. It is not denied that LIGHT and HEAT, both of which are allowed to be *substances*, though the weight of them cannot be ascertained, pass through glass. They both have certain properties, and are transferable from one substance to another, according to known affinities. And why may not this be the case with *phlogiston* also? Light certainly passes through glass, and is known to give to some substances colour, smell, and taste, which have usually been ascribed to phlogiston. That it does not revive the lead in passing through the hot glass, is no sufficient objection; for the same substances in different combinations, and different states, have different properties. The doctrine of chemical affinities has yet many difficulties attending it; and it requires the nicest discrimination of circumstances to make consistent tables of them. However, I only propose certain facts, which have not been considered before. Let others account for them in the best manner that they can.

I have made many experiments on the revival of precipitate in inflammable air, and never failed to find a great absorption of it, whether I found any fixed air in the remainder or not; and I should have repeated it much oftener, and on a larger scale, in order to ascertain with more exactness the quantity of inflammable air that is decomposed by a given quantity of precipitate, but that it has happened more than once, that the vessels in which I made my experiments have exploded, in consequence of the stand on which the focus of the lens fell becoming red-hot after a sufficient quantity of the pure air was produced, and mixed with the inflammable air. This accident, however, is a proof that the air expelled from the precipitate had not formed either water or fixed air. With care, however, much the greatest part of the inflammable air may be made to disappear without any explosion.

I hope soon to send you an account of other experiments, and shall be glad if you shall think them worthy of a place in your Repository.

With much respect, I am,
Dear Sir,
Yours sincerely,
J. PRIESTLEY.

ARTICLE VII.

Objections to the ANTIPHLOGISTIC DOCTRINE *of* WATER; *by Dr.* PRIESTLEY, *in a Letter to Dr.* MITCHILL, *dated Northumberland, August* 23, 1798.

DEAR SIR,

I THINK myself much obliged to you, and the Editors of the *Medical Repository*, for inserting the articles I have already sent you on the subject of *phlogiston:* and hope you will not object to a few more, calculated, as I hope, to bring a controversy of some importance to a satisfactory conclusion. The following appears to me to shew that the modern doctrine of water consisting of *oxygene* and *hydrogene* is not well founded; since, according to one set of experiments, it consists wholly of *oxygene*, and in the other, wholly of *hydrogene*.

If it be the water that is decomposed in procuring fixed air and inflammable air from charcoal, by means of steam, and if water consist of oxygene and hydrogene in the proportion of 85 parts of the former to 15 of the latter, they must be found in the same proportion in the result of the experiment. Fixed air is also said to consist of 28 parts of charcoal, and 72 of oxygene; and the inflammable air that is procured in this process, is said to consist of hydrogene and a little of the charcoal, without any oxygene.

But I have shewn, that by a slow supply of water, the whole of any quantity of water is expended without producing any fixed air at all; the whole produce being that kind of inflammable air which is said to contain no oxygene. Consequently, according to this experiment, water consists of hydrogene only. See my *Observations on Air*, (the new edition) vol. ii. p. 284.

This is not my assertion only. It is confirmed by Mr. Watt, whose accuracy no person will question. He says, in his *Description of a Pneumatical Apparatus*, subjoined to Dr. Beddoes' *Considerations on the Medicinal Use of Factitious Air*, p. 84. "It has "been observed by Dr. Priestley, and confirmed by my experi- "ence, that when much water passed in the form of steam, there "is much fixed air formed; but little or none when the water is "admitted so sparingly that no steam reaches the refrigeratory."

When I made the experiment here referred to, I supposed that heavy inflammable air contained fixed air in a combined state, because fixed air is found when it is decomposed with pure air. But I am now satisfied that this fixed air is produced in the process by the union of the two kinds of air. That this *must* be so in

some cases is evident, because the fixed air so procured is heavier than all the inflammable air employed.

The reason why more fixed air is produced when the supply of water is copious, is, I presume, because more water is necessary to the constitution of fixed air than to that of inflammable air.

From this experiment with *charcoal*, it would appear that water consists wholly of hydrogene; but from another that I made with *terra ponderosa aërata*, it will appear to consist wholly of oxygene. For when water, in the form of steam, is made to pass over this substance in a red heat, nothing but the purest fixed air is procured, without any inflammable air at all.

These experiments favour my general hypothesis, that water is the basis of all kinds of air, and that without it no kind of air can be produced. In some cases, as, perhaps, in that of the light inflammable air, it may constitute all that can be ascertained by *gravity*. And notwithstanding the great use that the French chemists make of scales and weights, they do not pretend to weigh either their *calorique* or *light*; and why may not *phlogiston* escape their researches, when they employ the same instruments in that investigation?

I am, dear Sir,

Yours sincerely,

J. PRIESTLEY.

ARTICLE VIII.

CONCERNING THE ELK.

By the late E. H. Smith, *Physician.*

THE accounts hitherto published by naturalists of the Elk and the Moose, two very remarkable animals of the deer kind, are confused and unsatisfactory. Beside the misapprehensions which they contain relative to both animals, all the difficulties in the way of obtaining just notions concerning them have been increased by the writers of Zoology having confounded one species with the other. Another source of error *probably* exists in some real dissimilarity between the Elk or Moose of Europe, and the Elk and Moose of North-America.

The description of the Moose-deer, by Mr. Dudley, (Philosoph. Trans. No. 368. p. 165.) I have every reason to believe is correct, as far as it goes: but it applies strictly to the *Moose*, and not to the Elk, which is a different animal.

M. de Buffon (Histoire Naturelle. L'Elan et le Renne.) appears, in several places, to have mingled the descriptions of both animals; and certainly considered Elk and Moose as two names for the same creature. And this is the more remarkable, as the several quotations which he has made from different authors contain manifest contradictions; as will be evident to any person who has seen either the Moose or the Elk.* The reader of M. de Buffon, therefore, will not be surprized if he obtain no clear notion of the *Elan:* as it is not probable that the illustrious author himself had a distinct conception of the subject of his description.

In Mr. Smellie's translation of Buffon (vol. vi. p. 350, &c.) there are several additions to the original article. The animal and head of an animal, mentioned by Mr. Allomond, were probably of the Moose kind.

Dr. Goldsmith (Hist. of the Earth and Anim. Nature. Art. Elk) acknowledges the discordancy of the various histories of the Elk; which he also supposes to be the same with the Moose; and he labours, very ineffectually, to reconcile the descriptions of authors. The figure given by him, resembles neither the Elk nor the Moose; and the reader will conclude the Doctor's account with

* See p. 543. Tome iii. p. ii. edit. 8vo. a Paris. 1775. The description (inserted p. 554 of the same edition,) copied from the Memoirs of the Academy of Sciences, is of the European Elk, and resembles the Moose more than the Elk of America; to which, however, it bears a greater likeness than is observable between this last and the Moose.

as little satisfaction as he appears himself to have done—when he says, "after all, this animal is but indifferently and confusedly "described by authors," &c.

The confusion and contradictions of preceding writers have been supposed to be avoided or removed by the celebrated Mr. Pennant, in his Arctic Zoology, a work to which those who are better able to judge on such subjects than I am, ascribe transcendant merit. In this work (vol. i. p. 19. art. Moose) the author pronounces "the Elk and the Moose (to be) the same species; the "last derived from *Musu*, which, in the *Algonkin* language, signi-"fies that animal." And this opinion seems to have been quietly acquiesced in; and the substance of Mr. Pennant's account has been copied into the Encyclopædia Britannica, and perhaps into other works of equal credit and circulation.

An opportunity having been presented to me of satisfying myself that Mr. Pennant has erred in describing the Moose and Elk as a single animal, I think it my duty to correct this mistake of that learned and amiable naturalist; and I am too well convinced of his love of truth and ardor for the advancement of natural knowledge, to doubt of his receiving my correction with candour and delight. It may be proper for me to premise that, from the best information that I can obtain (and I have had occasion to converse with several persons who professed to be well acquainted with both the Elk and the Moose), the history which has been given of the Moose, by that gentleman, is essentially just in every other respect than what relates to its identity with the Elk.

IN August and September, 1797, I visited, repeatedly, in company with Dr. Mitchill, Dr. Miller, Mr. Dunlap, and other gentlemen of my acquaintance, four Elks, then exhibited in this city for gain. Two of them were males, which the keeper assured us were but two years and a few days old; one a female, somewhat more than three years of age; the fourth a male fawn, a year old. They were taken separately, a few days after their birth; and had been reared by men, for the purpose above-mentioned. They were very docile, and might be handled and examined with perfect safety.

Colour. In this they all exactly resemble each other. In the spring, the colour of the hair is reddish; it then changes to a greyish dun (which was its appearance when observed by us); and, in autumn, to a grey, which continues through the winter. The rump is of a pale yellowish white; the colour extending about six or seven inches from the tail, on all sides, and very distinct from the general colour of the body. A black semicircular line, of unequal width, (from 2 to $\frac{1}{4}$ inches) separates the white of

the rump, on either side, from the dun or grey of the body. The forepart, or shin, of the legs, and the nose, are black. The under lip is fleshy; and marked, in all four, in an uniform and peculiar manner. Near the cheek, on each side, it is black; and a black stripe divides it, equally, underneath. The rest is white.—The male has a short mane, about two inches longer than the rest of the hair on the body. At this time the hair was very short; but in winter it is said to be four inches in length, and the mane six; and of the colour of the body. The male also has a beard, or covering of hair, under his throat and upon his breast, which, though short in summer, grows out, in the course of the autumn, six or more inches beyond the hair of the body; and is then, as now, of a deep black colour. This beard is wanting in the female. The male sheds it every spring.

Head. The head (as will be seen by the figure) resembles that of the common deer, and of the horse, much more than that of the Moose, and is pointed and handsome. The *neck* is rather long and handsome.

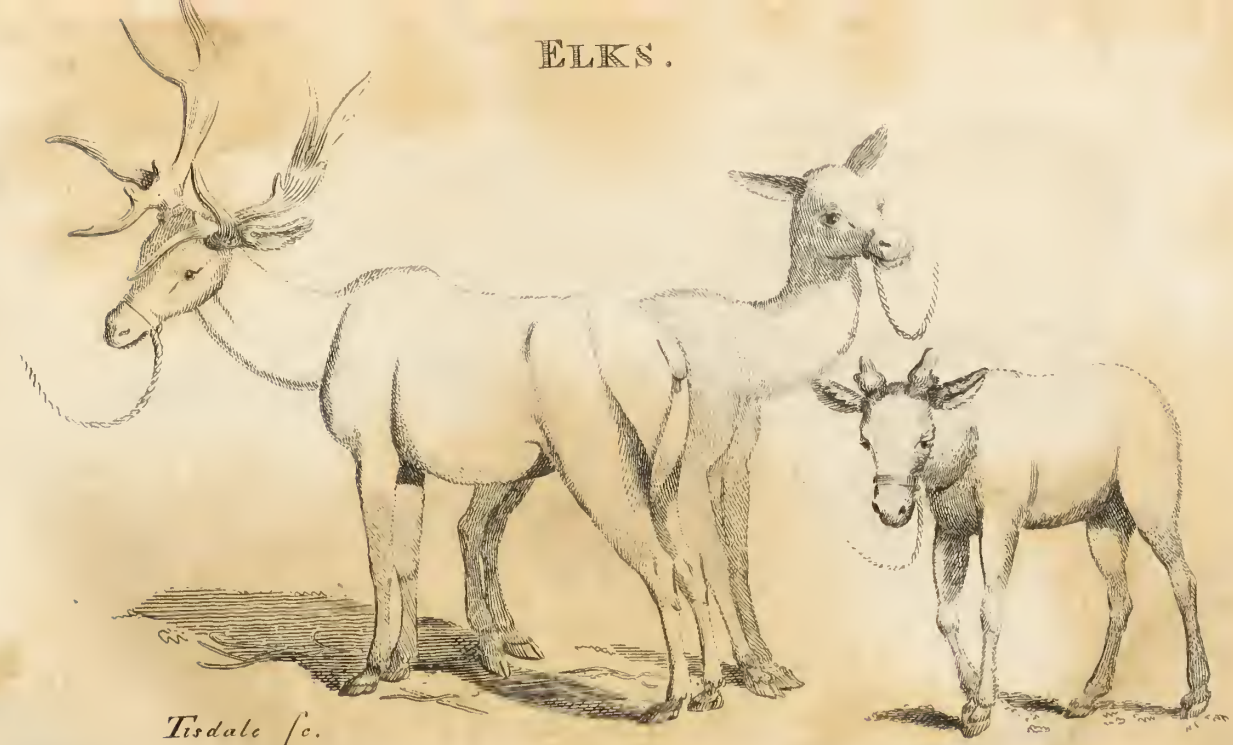
The Elk has an oblique slit or opening under the inner angle of each eye—externally, of near an inch in length; which is said to communicate with the nostril.* But this we could not correctly ascertain by examination, though there seems no reason to doubt the fact. Something of the same kind obtains in the Fallow Deer, supposed to be analogous to the *puncta lachrymalia* in the human head. (See Mr. White's Nat. Hist. of Selborn. See also Encyclopædia, art. *Cervus.)* A like opening is noticed by Sparman, and supposed by him to answer the purpose of facilitating free respiration, in the Cervine Antelope—(*antelope bubalis* of Pallas.) See Encyclopædia, art. *Capra.*

The use of this opening is differently explained by the proprietor of the animals here described. He assures us that the Elk possesses the power, by strictly closing his nostrils, of forcing the air through these apertures in such a manner as to make a noise which may be heard at a great distance; that he has seen the wild animals do this frequently; and that the design of it is to alarm each other when they suspect any danger near. He has taught those in his possession to make a similar noise; but it was too feeble to cause any observable dilatation of the slit.

If the above explanation of the keeper of these Elks be just, it will probably lead us to a more accurate notion of a circumstance related concerning the *Rupri Capra* or Chamois of the Alps, of whom it is said that " when he smells or hears any thing

* Mr. Campbell, of Richmond, Virginia, informed me, that in the skeleton head of an Elk, which he had seen, the opening under the eye communicating with the noſtril, was ſo large that the thumb might be eaſily introduced into it.

ELKS.



Tisdale sc.

" which he can not see, he *whistles* or *blows* with such force, that " the forests and rocks re-echo with the sound." (See Encyclopædia, art. *Capra*.)

Horns. The female has no horns. The appearance of the horns of the fawn exactly resembles those on the head of the principal figure (opposite p. 18.) given by Mr. Pennant.—The males (as the keeper informed us) drop their horns annually, in May, then leaving a pith about four inches in length, which is soon covered and protected by velvet. In eight weeks the horns begin to grow again. In the animals we saw they had been growing about eight weeks. On our first visit, the horns were uniformly covered with a smooth velvet. About ten days after, the velvet was coming off in narrow strips, leaving the horns bare. By the middle of September they were entirely free from it. The keeper informed us that the animals freed their horns from it, when wild, by rubbing them against trees. Now, they derived the same aid from the posts, &c. of their stable; and the proprietor occasionally assisted them. It was observable that a small oozing of bloody lymph sometimes succeeded the removal of a strip of the covering.

The horns of the Elk, instead of being palmated as are those of the Moose, consist of three principal divisions:—1. The brow antlers, which the hunters call the *altars;* 2. The two middle prongs—called the *fighting-horns;* and, 3. The *horns* properly so called. The two first retain their simplicity; the last increases in complexity every year. They do not, as those of the Moose are said to do, acquire a new branch every year; though something analogous actually occurs. When the animal enters his third year, a single prong or point comes out on the inside of the *left* horn; the next year, a similar point on the inside of the *right* horn; and so alternately. Four short points, called *pikes*, were now apparent, one on each brow antler, and one on each fighting-horn: They seldom exceed an inch in length.

The following measurements were made of the horns of one of the male Elks. They were somewhat longer than those of the other; notwithstanding an inch or two had accidentally broken off from the end of one of them.

	F.	Inch.
Distance between the roots or origin of the horns,		4
Brow antlers,	1	6
Fighting-horns, not measured, but about the same.		
Longest horn,	3	
From the tip of one horn to that of the other	2	6

I recollect to have seen, in the Museum of Yale College, New-Haven, Connecticut, some years ago, a remarkable pair of horns, supposed to have belonged to a Moose or Elk. They were not palmated; and, though I had not at that time devoted any attention to

subjects of Natural History, yet from the general idea which I retain of their figure and composition, I am persuaded that they must, at some period, have ornamented the head of an Elk. If I am right in this particular, it will afford us some notion of the size to which the horns of this animal attain. The horns in the Museum of Yale College, if I do not misremember, were said to weigh 55 or 56 pounds.

SIZE. As the animals now described had by no means attained their full growth, it is impossible to give any precise information concerning it. The measurements made of them in their present state are as follow:

	F.	Inch.
Length of the *male*, from the tip of the nose to the tail, along the line of his back, (the males were nearly of a size)	7	3
Of the female, (a year older than the males)	7	9
Height,	4	7
Round the girth or belly,	5	6
the withers,	4	10
Length of the head,	1	11
tail,		3
From the extremity of one ear to that of the other,	2	2
Length of the ear,		9

The brisket of the Elk very much resembles that of the Ox.

PLACE AND FOOD. The Elks which were exhibited here were brought from Upper Canada. They are said to be found in almost all the back country of the United States, as low down as Virginia. In respect to food, as these had been domesticated from infancy, nothing particular could be learnt from them concerning what they most affected in the wild state. What appeared remarkable to us was, that they all ate *tobacco*, as variously prepared by the tobacconist, with greediness. This the proprietor assured us was a natural appetite; and that the wild Elks ate the wild plant. We thought that this required further evidence; notwithstanding, we are informed by Hasselquist, that the *Cervi Capra* of Barbary "loves the smoke of tobacco; and, when caught alive, will approach the pipe of the huntsman, though otherwise more timid "than any animal." Encyclopædia, art. *Capra*.

YOUNG. The rutting-time is from about the 20th of September, to the 1st of October. The female goes about nine months; generally brings forth twins; and it seldom happens but that one is male, and the other female.

GAIT, &c. The hoofs of the Elk are very much cloven; and, like the Moose and Rain-deer, he makes a great clattering with them in travelling. He is very fleet. A stranger who was viewing these Elks at the same time with us, told us that he had seen

Elks used in sleighs the last winter; and that they were easily managed, very strong, and very serviceable. He represented them as travelling at the rate of 18 or 20 miles an hour. It is possible that it was the Rain-deer that he saw used in this manner, in Canada.

Flesh and Skin. The flesh is said to be excellent; and the skin employed for various useful purposes.

Oil-spring. On the outside of each hind leg, the Elk has a small vesicle or bag, which contains a thin unctuous substance, that the hunters call *oil*, and the bag the *oil-spring*. The male is said to open this, by means of his horn, as the horns begin to grow; when the oil spreads over the young horn, and is supposed to nourish and protect it. This he does regularly, the keeper informed us, at 10 P. M. and at 4 A. M. The female has not been observed to make any use of this oil, except when wounded. She then, it is said, opens the bag with her tooth, and applies the oil, by means of her tongue, to the wound.

In rutting-time, the Elk is represented as contriving to throw his urine upon this vesicle; which inflames in consequence, and emits a strong scent, whereby the animals discover each other in the woods. With regard to the superstitious notion concerning the Elk's curing himself of the epilepsy, by means of his hind hoof, &c. (see Pennant's Arctic Zoology, art. Moose,) may it not be probable that the belief originated from the use he makes of the oil-spring; of which the earliest European writers might be ignorant?

ARTICLE IX.

An Account of a Species of CANTHARIS, *found in Buck's County, Pennsylvania; including Observations on its Medical Qualities.*

By ISAAC CHAPMAN, *Physician.*

TWO or three years ago, William Smith, an intelligent person in my neighbourhood, informed me, that one day, as he was at work, he accidentally mashed an insect on his shoulder, which, in a short time, produced a complete vesication; and it appearing to be the insect here described, I was determined to gather some of them, and give them a trial in my practice; which, however, I neglected doing until last summer.

This insect has a very near resemblance, in outward form, to the Meloe (vesicatorius) alatus viridissimus nitens, antennis nigris, (Linn.) or Spanish Flies, as they are commonly called; but is rather smaller than even those brought from Spain, and of a very different colour: the head is of a very light red, with black antennæ; the elytra, or wing cases, are black, margined with pale yellow, and a stripe of the same colour extends along the middle of each of them; the tarsi have five articulations; the mouth is armed with jaws and furnished with palpi.

I found them in greatest number in potatoe patches; and when the potatoes are young they frequently devour all the green leaves: they are also found among beets and garden purslane, the leaves of both which plants they are very fond of.

In the summer of the year 1797, observing them so plentiful in my garden, that they nearly destroyed those vegetables for which they had a predilection, I determined to gather some of them, and try their medical qualities; and, accordingly, one afternoon I went out, and soon caught as many as, when dried, weighed about an ounce.

When I had dried them, Isaac Praul, one of the young gentlemen studying medicine with me, powdered five or six of them, and laid the powder on a plaster, about an inch and a half square, and applied them to his ankle, and in eight or nine hours they raised a very good blister: he observed they produced a very slight strangury.

Finding them, in this first trial, to answer my expectations in the fullest manner, I determined next to try them in some cases of disease where I thought blistering indicated: and from my notes the following observations are extracted.

1. A. W. aged 21 years, had been for two or three years much disordered with nervous symptoms, which sometimes produced slight paralysis of one arm and leg, for which he had been several times blistered with advantage. And this complaint now appearing in his arm, I, in the evening, applied a plaster of these flies to his wrist, and desired him to come to me in the morning. When he came in the morning, the blister had been cut and dressed with cabbage leaves, and, to my great satisfaction, I found the vesication had been more perfect than any the European flies had produced; and I found the water dropping from the dressing as he came to me. He said it produced no strangury. The plaster was on about ten hours.

2. Not long after the above case, A. W.'s sister, aged 18, informed me she had been much afflicted with pain in her head, for which, among other things, I directed a blister to be drawn on the back of her neck; and the same plaster that had been on A. W.'s wrist was applied without any addition of flies; was on about eleven hours, and drew a very good blister.

3. M. C. aged 20. I applied plasters of these flies to her ankles, where they drew very good blisters; and a few evenings after, the same plasters, without any addition of flies, were applied a little below her knees; but she being very delirious, was so uneasy that the nurse was induced to take them off four hours after putting them on, at which time she saw no appearance of vesication; but in the morning she was much surprised to find large blisters filled with much water.

Those being the first cases in which I used these cantharides, I have noted them more particularly; since which I have used them in near one hundred cases as vesicatories, and in every trial I found their qualities equal, and rather superior, to that of the European cantharides; and they appeared to have full as much effect in relieving the symptoms and removing the diseases for which they were applied, as the European; and their effect on the system was the same, having, in several cases, produced a slight strangury; and the diseases in which I used them were various, as fevers, pleurisy, nervous diseases, &c.

Having determined the quality of this insect as a vesicatory, I wished to know if this quality pervaded the whole fly, or lay in a particular part; observing that internally the insect had a very different appearance from those brought from Europe. In the thorax the muscles have a white appearance, and in the abdomen of the dried insect is a hard white substance, about the bigness of a grain of wheat: this appears to be composed of a glutinous and oily matter, with particles of salt intermixed, and is divided into two parts: one part is very hard, round, and not so white as the other, and is situated in the upper and middle part of the abdomen;

the other forms a leaf that envelopes the round part, fills the lower part of the abdomen, and is very white. These, when powdered, appear like meal; and, when rubbed with water, form an emulsion that looks like milk.

4. After carefully removing the cuticle of three or four flies from the white substance in the abdomen, I powdered it, weighing about half a grain, and spread the powder on a plaster about the size of a pistareen, and applied it to the ankle of one of my students, which, in eight hours, raised a good blister.

5. I took the elytra of four or five flies, broke them to pieces by rubbing them between my thumb and fingers, when they appeared as light as dust, and did not weigh more than a quarter of a grain; this I spread on a plaster, nearly as large as a pistareen, and applied it to my own ankle, which, in nine hours, raised a good blister.

6. Joseph Wilson, one of my students, applied about half a grain of their legs, unpowdered, on a plaster nearly as large as a pistareen, to his ankle, and in eight or nine hours they drew a good blister.

From these experiments it appears that every part of the insect is endowed with an equal, or nearly equal degree of their quality; they likewise shew their great power, as about one quarter of a grain was sufficient to produce a good blister, as large as a pistareen; and I have no doubt, had the same plaster, without any addition of flies, been re-applied, it would have drawn, repeatedly, three or four blisters.

I have not given them internally; but from their similarity of effect to those brought from Europe, when outwardly applied, I think there can be no doubt of their having the same operation when administered inwardly.

This insect must be a very valuable addition to the materia medica of the United States: and if the attention of physicians, and the inhabitants of the country can be sufficiently turned towards them, they will, in a few years, take place of those brought from Europe; and I have no doubt but a sufficient quantity of them can be gathered, at a very moderate expence, to supply the United States, if they are to be found in as great numbers in other parts as in my neighbourhood.

They appeared, last summer, in such numbers, in my garden, (which is a small one) that, with very little trouble or time spent, I could have gathered a pound of them at least.

To point out the method in which they may be gathered, killed and dried, I will relate the practice I pursued.

I took with me into my garden an earthen mug that would contain a quart; in this I put the flies as I caught them in my hand: as they seldom attempt to make use of their wings to fly, nor could

they creep up the sides of the mug, it contained them with safety. Finding them very tenacious of life, living several days after the heads were completely bruised, I set the vessel containing them in boiling water, which, in a few minutes, deprived them of life.

When killed, I laid them on wrapping paper, and exposed them to the rays of the sun, which, in two or three days, dried them sufficiently. Perhaps, if they were dried in an airy place, in the shade, more of their medical qualities might be retained; for, undoubtedly, part evaporates in drying, as very pungent volatile effluvia arise from them, as appeared on placing an ounce of them in my parlour window to dry: there soon arose from them such acrid, disagreeable effluvia, as occasioned a very pungent, prickling sensation in my nose; and I felt a considerable degree of uneasy sensation in my head, which made it necessary to remove them out of the room.

They might be dried in the open air, provided they be kept from the dews and rain; but they should be kept out of bed-rooms as long as any effluvia arise from them.

These cantharides are certainly worthy the attention of physicians, their medical qualities being equal to that of those brought from Europe; and, as far as I can judge from repeated trials of them, superior. As vesicatories, they are more certain in their operation than any I have procured from the apothecaries' shops; and they may be procured at a cheaper rate; and, being a production of our own country, a regular supply may always be had, notwithstanding foreign wars and an interrupted commerce.

To people residing in the country, the knowledge of this insect and its qualities must be of great advantage, as it will enable them to gather, in their own gardens and fields, one of the most useful and powerful medicines in the materia medica. With a little attention they can not only gather sufficient for their own use, but to supply the cities and towns; and if they shall be found in as great abundance throughout Buck's county as in my neighbourhood, sufficient may be gathered in that county to supply one half the United States.

As no difficulty attends gathering them, children may be profitably employed in that business; and as cantharides bear a high price, frequently from ten to sixteen dollars the pound by retail, they will be an object worthy the attention of many people; and when, by this means, a sufficient quantity of them shall be gathered to supply the place of those imported, many thousands of dollars will be retained in our country, that are annually sent to Europe for this article.

ARTICLE X.

On the Disappearance of SWALLOWS *in Autumn; in a Letter from Mr.* PETER COLE, *to Dr.* MITCHILL, *dated New-York, September* 25, 1798.

DEAR SIR,

IN consequence of the epidemic now raging in this devoted city, I have not had an opportunity to give you a detail of what I intimated to you some time ago, relative to the disappearance of *Swallows*.

In my early years, a number of my school companions and myself used to make it a practice to hunt what we termed *Ground-Swallows, (hirundo riparia)* in a bank in the neighbourhood of this city, contiguous to where the Jew's-burial-ground then was: In one of these boyish amusements, I recollect two gentlemen passed nearly by us, who stopped and examined the birds we had dug out of the hill; whereupon a conversation took place relative to the migration of the Swallows. The gentlemen both agreed that they were preparing for their winter quarters, and one of them farther added, that he supposed that numbers of them kept in a meadow close by. These observations made such strong impressions on my mind, that they have never since been erased.

After our revolutionary war was over, and my return again into this city in 1783, in order to be convinced of the truth on this curious and controverted subject, I made it a practice to walk around the Collect,* mornings and evenings, in the seasons when they assembled, in order to mark their flight or return again; but could not discern any thing material until the 3d instant. As I was standing at my door, between the hours of five and six in the morning, I observed a very large flock of Swallows flying in an easterly direction. I immediately repaired to the pond where there was already a vast number collected in the reeds and rushes. They continued coming for nearly the space of half an hour, and vast numbers of them were flying over the water in almost every direction. Some of these birds appeared to run on the surface of the water with great rapidity towards the east corner of the pond, and in the twinkling of an eye, disappeared under the water and rose no more.

They seemed to crowd principally towards that particular spot.

* A pond of fresh water adjoining a marsh in the vicinity of the city of New-York.

But what is somewhat remarkable, and deserves particular notice, is, that among the rest I observed a number of *white* ones intermixt with the rest. While I was standing on the edge of the pond with my spy-glass, Mr. Brooks, a particular acquaintance of mine, who lives near the place, came towards me. I mentioned my errand to him. He stood with me a considerable time, and saw the same. I observed to him that there were *white ones* among them. He replied that they were seen three or four days ago. His word may be relied on as a man of strict *honour* and integrity.

Thus, Sir, I have given you a short sketch of what has come within my own knowledge, and what I earnestly wished to discover. I hope I shall not intrude upon your patience if I subjoin an extract from the Christian's, Scholar's, and Farmer's Magazine, volume the second, page 735—it runs thus:

February 23, 1790. In Ulster County, in the state of New-York, on an island in the Never-Sink-Creek, nearly in the latitude of 41° 30′ North, a Mr. Baker, in the beginning of the month of March last, having cut down a large hollow beech tree, to his surprize, found the cavity in the tree nearly filled with the common Barn-Swallows *(hirundo rustica)* of this country, in quantity (by his estimation) nearly two barrels: they were in a torpid state; but carrying some of those which were not injured by the fall of the tree near a fire, they were presently reanimated by the warmth, and took the wing with their usual agility. This may be depended on as a fact.

I take the liberty also to mention another relation from the American Museum, volume the third, page 451—2. It is taken from Mr. Josiah Blakeley's letter to Mr. Carey, dated Baltimore, January 7, 1788. As the piece is of considerable length, I shall only quote a few passages from it—he begins thus:

The history of our common Swallows has long been a problem in ornithology. Whilst people in general supposed them birds of passage, a few who appear to be better informed, supported the contrary. The opinion of the many was founded on what they thought probable; that of the few on facts. In the year 1780, I was conversing with a person who lived about twenty miles from Boston, on the phenomenon of the sudden exit, but gradual and irregular return of Swallows. The gentleman to whom I made these remarks, replied, that they were not birds of passage, and the cause of their sudden disappearance, but irregular return, was, they had a fixed day for immerging in the water, but none for emerging from it. On my doubting his hypothesis, he told me, that as a neighbour of his, not long before, was draining a pond, on a warm day, near the season of the year in which the Swallows first appear, his attention was attracted by observing the mud, which, in consequence of draining the pond, had for some time

been exposed to the sun, move and appear animated; he then ordered a quantity of this mud to be conveyed into a room in his house, which he caused to be gradually warmed by a slow fire. From this mud there soon arose a number of Swallows, hovering over himself and family, who had been spectators of their *resurrection.*

These few observations, however imperfect, may possibly afford a large field for speculation to the philosophic mind, and lead to useful discoveries. For my own part, I am now become a proselyte to the doctrine of the Swallow's remaining in a torpid state during the winter, not only from speculative researches, but *ocular demonstration.*

PETER COLE.

Pennant, in his British Zoology, vol. i. p. 414, feels disposed to smile at the accounts given by OLAUS MAGNUS, DERHAM, and KLEIN, of the submersion of Swallows. Let the physiologist and anatomist reason on the matter as they may, there seems to be positive evidence of the fact. E.

ARTICLE XI.

Observations on the Use of the WARM BATH, *in Cases of laborious Parturition; communicated in a Letter from Dr.* WILLIAM DEWEES, *Lecturer on Midwifery in Philadelphia, to Dr.* E. H. SMITH.

DEAR SIR, *Philadelphia, July* 31, 1798.

I PROMISED you the result of my experience, observation and inquiries, respecting the use of the warm bath, in cases of laborious parturition, arising from rigidity of the soft parts.—I have taken some pains to collect facts on this subject, and have endeavoured to weigh its merits with all that impartiality which ought to accompany an inquiry after truth. I think I may venture to say, with safety, that I have not been influenced by prejudice in my investigation, or directed by caprice; but, on the contrary, have, as far as my own practice and the experience of my friends will allow, given fairly the result of its effects.

The warm bath is by no means a new remedy in that species of labour, in which I have thought blood-letting of so much consequence. Few writers on the subject of midwifery have failed mentioning it among other means to overcome the rigidity of the soft parts in laborious labours, that does not depend on a mal-conformation of the pelvis. The French accoucheurs, more particularly, make frequent mention of it; yet none of them, that I am acquainted with, have laid any particular stress upon its virtues in these cases, or place any great dependence on its effects. It has been rather recommended as a probable, than as a certain remedy, and stands upon much the same footing as opium—sometimes, perhaps, succeeding, but much more frequently failing—with me it has ever been of little or no consequence; nor can I obtain a more favourable character of it from the friends I have consulted. The result, then, of my experience, inquiries and observation, may be reduced to three heads: 1st. Its being almost always inconvenient—2dly. Its being sometimes ineligible—and, 3dly. Its always being limited, and uncertain in its effects.

The very great difficulty that generally attends the warm bath, makes a very strong objection to its use; or, in other words, renders it almost impossible to be employed, as very few people are in possession of a suitable apparatus.* It might, however, on

* Whenever I mention the warm bath, I would always wish to be understood to mean the universal warm bath, presuming it to be what you, in your letter, adverted to.

extraordinary occasions, with great difficulty, be procured; but, in obtaining it, much time would be lost, particularly in the country, where this kind of labour is by far the most frequent. The lancet we may always have at hand.

It is sometimes ineligible, occasioning, in some instances, very profuse and alarming hæmorrhages. A fatal instance of this kind happened not long since in the practice of a physician in the neighbourhood where I formerly practised. It was universally attributed to the warm bath; and the Doctor himself, in a conversation with me, inclined to the same belief; at the same time assuring me he derived no advantage whatever from the warm bath, as the parts were no more disposed to yield than before; and the woman eventually suffered a lacerated perinæum. The warm bath, in this instance, evidently did mischief, by preventing the tonic contraction* of the uterus from completely taking place, whereby the vessels of the uterus were not contracted upon, and a fatal hæmorrhage ensued. This is not the only instance in which it has done harm in this way. A Dr. Tom, who had an extensive practice in this line, and who employed the warm bath frequently in these cases, informed me that it never failed producing a more than ordinary flow of blood from the uterus; and, in some instances, this happened to an alarming degree. He, however, urged, in defence of his employing it, that he knew nothing better—opium had always failed with him—and that he considered the warm bath as the dernier resource, adding, he thought it had sometimes done good. Besides, cases occur where we could not leave our patients to themselves sufficiently long to derive any advantage from the bath, was any to be expected, without running a risk of the most dreadful consequences ensuing: for instance, the case I sent you sometime since.† Here it would have been impossible to have left my patient a minute to have been placed in the bath, as it needed not only all my care, but likewise great exertion, to prevent the head of the child escaping through the anus, &c. Again, the inconvenience, nay, I may say, the almost impossibility of rendering the woman proper assistance when in the bath, will readily occur, and will be an additional objection to its use. But, above all, the extreme indelicacy that must appear when employed in that situation, was it ever practicable, would be sufficient to render it the dread of the woman, and the aversion of the modest practitioner.

With me and with my friends it has always been limited and uncertain in its effects—so much so (as I have already observed)

* By tonic contraction, I mean that power that reduces the uterus to its natural size, after having been distended.

† See Med. Repos. vol. ii. p. 24.

as to be of little or no consequence; its influence having never extended beyond partially relaxing the more external parts, and even this relaxation continuing but a short time after the bath was desisted from. I have never known it have the least effect on the neck or mouth of the uterus; nor can I find that it has ever done so unequivocally in any instance as far as my inquiries have extended. It frequently has produced no effect whatever, not even on the external parts. And should it ever relax the more external parts, no great advantage would be derived as long as the mouth of the uterus continued rigid; and I cannot find that it ever has had that effect. The yielding of the neck of the womb appears to be a distinct process, very often, from the relaxation of the other soft parts; at least they do not always keep pace with each other, having frequently seen the uterus well dilated, with a very rigid os externum, and vice versa—the one attended with an increased secretion and discharge of glairy mucus; whereas the other is not accompanied with these marks. The vagina and external parts, sometimes, after having been well relaxed, become again rigid and unyielding; but the uterus, after having been once well dilated, never (as far as my observations extend) closes, and makes resistance, until after the expulsion of the child: so that it appears that all these parts are not influenced, at all times, by the same laws or causes.

It may perhaps at first sight appear a paradox, that in some cases I should fear the warm bath producing a too great discharge of blood from the uterus, and directly after assert that in no one instance could I find it had any effect on the os uteri. But I do not perceive any contradiction here, as every body must admit, that the developement of the neck of the womb, or its perfect expansion, must be a very different process from its tonic contraction. In the one instance, a peculiar arrangement of the fibres that constitute the neck or mouth takes place, so as to admit of the passage of the child, &c. Whereas, the power which reduces the uterus to its original size after the expulsion of its contents, and by which a too great discharge of blood is prevented, in the other instance, is diminished—hence hæmorrhagy. And we may, in some instances, safely, I think, conclude that the warm bath, although it does not produce relaxation, may yet prevent contraction.

With respect to fear being entertained, that the necessary quantity of blood to be drawn to accomplish the design in view, being more than can be well borne, and occasioning a tedious convalescence, you may rest assured is groundless. I do not rest this opinion upon a solitary instance, but upon many; and I particularly mentioned in the case related to you, that that woman had a rapid convalescence, notwithstanding the great quantity that was drawn. Nor have I seen any thing untoward happening (where

it has been employed to a very great extent), that could possibly be attributed to the loss of blood. Nay, I do not recollect a single instance where any thing particular supervened in all the cases I have been under the necessity of employing it; but, on the contrary, their recoveries were rapid, and without what is commonly called *pull backs*. The case related to you was chosen from several, because of the great quantity of blood that was drawn, and the very remarkable circumstances that rendered it necessary. It was by no means intended to imply that every case required an equal quantity; for, on the contrary, in cases of great rigidity, thirty or forty ounces have been sufficient, and, in some instances, a much less quantity has answered.

Besides what I have urged above, I must not omit telling you that I have experienced, in the most convincing manner, the superior efficacy of blood-letting to the warm bath. A case occurred to me that put the two remedies, I think, to a very fair trial. A woman had been a long time in labour, and from the great rigidity of the parts concerned, the midwife, entertaining no hopes of a speedy delivery, thought proper to send for a physician. He ordered the warm bath, and thirty-five drops of laudanum; these not succeeding as he expected, the woman was again ordered the bath and the anodyne. Several hours were spent in this way; the woman every hour or two was placed in the bath, and took fresh quantities of laudanum—but all without benefit. I was now called in. We agreed that the woman should be very freely bled. This was done. When, upon the loss of about thirty ounces of blood, she grew very sick and faint, her friends grew uneasy, and would not allow the bleeding to be carried to complete fainting. I was obliged to tie up her arm, and rest satisfied with what was already drawn. This, however, fortunately proved sufficient; for the parts began immediately to relax, and in about three quarters of an hour, she was made the happy mother of a living child.—This case decides most unequivocally, I think, the superior efficacy of blood-letting; and the quantity here lost was very trifling, when compared with its advantages. Nothing unfavourable happened afterwards. The woman had a speedy getting up.

I am, Sir,
Yours with respect,
WM. DEWEES.

ARTICLE XII.

Answer to the Question, Whether any, and what, Effect is to be attributed to the greater or lesser quantity of Variolous Matter, introduced into the System by Inoculation, &c.

By Louis Valentin, *Officer of Health of the first Class, and lately in Chief of the French Hospitals in Virginia—a Fellow of many Academies.*

I HAVE read, in No. I. of the first volume of the Medical Repository, that communications are requested on the subject of the quantity of matter inserted in the inoculation of the small-pox. The attention of practitioners is called on that point: whether the greater or lesser quantity of variolous matter introduced into the system, will produce a more or less severe fever and eruption. That opinion is countenanced by some Physicians of good character. Without expatiating on a practice now so generally used, in which I have been reared up twenty-three years ago, and which I continued for four years at Norfolk, with great success, I will say only that I have seen the present case often become a question.—Some thought the degree of fever and quantity of eruption are increased—others modified by the quantity of matter introduced by inoculation. Both experience and observation have, according to me, answered it as far as it may be expected.

I never perceived any difference, with respect to the intenseness of the fever and the number of pustules, when I made many punctures, and introduced the greatest quantity of fresh matter I could possibly. Whether all the limbs, or several parts of them, be inoculated at the same time, with the thin matter which first appears in the pustules, and has a more certain effect than that which is maturated, or whether only one puncture be performed, it is all one. I never make incisions; the inconvenience and trouble attending them being sufficiently known. I make punctures, and never draw blood

I do not think that a milder disease is communicated by diluting the variolous matter, which is not too old; for here is my dilemma: either the matter to be inserted has the requisite qualities, or not. If it is liquid, just gathered and immediately inserted—if the subject has all the necessary dispositions for the absorption and unfolding of the disease, only one atom of virus is as powerful as many drops to give it. If the dilution of dry and new matter is not in reasonable proportion, or if it is rendered too liquid

with water, it may have no effect: likewise, when undiluted, it is incapable of being absorbed; when too old, of acting and producing the desired effect. But, in all cases, should the smallest particle that one can imagine be absorbed, it is sufficient to put in motion what we call disposition to that disease, as much as when a more considerable mass of matter is inserted. This may be easily conceived and illustrated by the following comparison, if allowed: Does not every one know, that one grain of powder, inflamed in the pan of a fire-arm, produces the explosion of the whole charge of the gun, as well as when the same fire-pan is filled up with powder? Surely the explosion, in both cases, is neither more nor less considerable; therefore the quantity of inserted matter has no influence to produce the number of pustules. Sometimes the whole surface of the body was covered with pustules, when I made only one puncture, and loaded the point of the lancet with a very small particle of diluted matter, collected for many days, and in the state of maturity; as I have oftentimes seen the contrary by endeavouring to insert the greatest possible quantity of virulent and fresh matter, just taken before the maturation, in performing a number of punctures, and a light fever, and very few pustules, (sometimes a local small-pox) was the result. Likewise, I have washed, with fresh or salt water, the inoculated part, immediately after the operation, and the infection took place. It was the same with young people, who, struggling at the very instant of the insertion, caused the lancet to fall from the inoculator's hand; the instrument passed through the stocking, pricked the leg, and wrought its effect as well as if the insertion had been performed on a naked place. Besides, all these circumstances depend on the good or ill conditions of the individual, and his dispositions to catch the disease.

I shall be happy if these simple reflections may be of any usefulness, and elucidate, to a certain point, that interesting subject.* There are also some observations of Dr. Giraud, inserted in the Memoirs of the Society of Physic in Paris, on the same matter. He has repeated the experiments often and often, and constantly found the same result.

Montpellier, August 20, 1798.

* Some hints about it are to be found in my Dissertation, printed at Nantz, in the year 1786, *De optima Methodo Variolas Inoculandi; et Inoculatos Tractandi;* which may be had in the library of the Philosophical Society of Philadelphia. It is dedicated to Dr. Dezoteux, who, after having gone over twice to England, contributed the most to extend that beneficial practice in France, and whose opinion, concerning the present question, was inculcated to my mind, and became verified by my own practice.

REVIEW.

ART. I. *Medical Inquiries and Observations:* Containing an Account of the Yellow Fever, as it appeared in *Philadelphia*, in 1797; and Observations upon the Nature and Cure of the Gout and Hydrophobia. By *Benjamin Rush*, M. D. Professor of Medicine in the University of Pennsylvania. Vol. v. Philadelphia. *Thomas Dobson.* 1798. 8vo. pp. 236.

THE former publications of the author of this work, on the Yellow Fever, have been justly sought after and read with great avidity. The zeal he displays in the pursuit of truth, his indefatigable labours to investigate the nature of this disease, and the enlightened interpretation he offers of many of its mysterious phenomena, have assigned him a distinguished rank among the benefactors of science and humanity. Placed in a situation where the worst ravages of the disease have taken place, he has lost no opportunity of pursuing his inquiries concerning it, and communicating the result to the world. In our opinion, his meritorious career, in circumstances so trying and perilous, cannot be too warmly exhibited to the applause and imitation of the medical world.

In connection with the 4th volume of his Inquiries and Observations, reviewed in former numbers of this work, the author begins with an account of the weather and diseases which occurred in part of the year 1795, and the whole of the year 1796. The importance of this statement will be obvious to every reader. The constitution of the atmosphere in this country, for several years past, has been favourable to the generation of pestilential diseases; and while this continues, it will be especially interesting to record all the appearances of weather and diseases that can be supposed to relate to it. Long and minute observations will probably be necessary to detect the nature and causes of such noxious constitutions of the atmosphere, and to explain the grounds of their irregular and desultory operation in the different seasons and situations where they are observed to exist.

The opinion, quoted by our author from Mr. Webster, of a connection between pestilential epidemics and the occurrence of earthquakes, and of the eruptions of volcanos, the appearance of comets, meteors, &c. is supported by history and certainly deserves the closest attention. But strong objections will arise to the supposition, hinted by the author, of a connection between a

morbid constitution of the atmosphere and the halo or corona, described by a writer in the Philadelphia Gazette of July 25, 1796. This corona seems to have exhibited nothing uncommon; for it is well known that phenomena of that kind are very frequently seen throughout North-America. They have been alleged to proceed from the same causes that produce the rainbow. Water collected into drops, and falling in rain from the clouds, will, under certain circumstances of the sun's rays, display the colours of the rainbow; the same water rarified into vapour or thin cloud, and under a different disposition of the sun-beams, will present the more dilute colours, and all the varied shapes and sizes of the corona. The different texture of the clouds will account for a prodigious variety in the appearance of these phenomena. And as, therefore, the various modes of refraction and reflection of the rays of light in passing through particles of vapour will produce all these phenomena, there seems to be good ground to conclude that no connection exists between such coronas and a morbid constitution of the atmosphere.

Having given a sketch of the weather and diseases from the close of his former work on this subject to the beginning of the epidemic in 1797, Dr. Rush states, that the first appearances of the Yellow Fever were observed in July. In the month of August, the cases became more numerous; and about the middle of that month, the disease began to prevail in the village of Kensington. It was chiefly confined to the district of Southwark, and the village of Kensington, for several weeks. In September and October, many cases occurred in the city, but most of them were easily traced to the above sources. After the first week in September, no diseases were to be seen but Yellow Fever. On the 10th of October the weather became cool, and on the night of the 12th and 13th of the same month, there was a frost, accompanied by ice, which appeared to give a sudden and complete check to the disease.

The fever, in the opinion of our author, was derived partly from the putrid exhalations from the gutters, streets, ponds, and marshy grounds in the neighbourhood of the city, and partly also from the noxious air emitted from the holds of the snow Navigation, from Marseilles, and that of the ship Huldah, from Hamburgh.

No new premonitory symptom was observed except tooth-ach, which remarkably preceded the attack of the fever in several cases.

Dr. Rush next proceeds to deliver an account of the symptoms of the Yellow Fever, as they appeared in the blood-vessels—in the excretions—in the nervous system—in the senses—in the lymphatic system—in the skin—and in the blood. Many interesting observations are here detailed, but as they do not readily admit of

abridgment, and differ not materially from the description of the disease formerly delivered by the same hand, we are compelled to refer to them only in general terms.

The various types or forms of this fever, as noticed by our author, are extremely worthy of attention. It assumed almost every possible grade of mildness and malignity. Attention to the milder grades will not only put physicians on their guard against the insidious progress of the disease, but serves also to evince the connection of this destructive epidemic with others which pass under a less alarming denomination.

The means of preventing an attack of the disease, adopted by the author, are entitled to great consideration. He sheltered himself, as much as possible, from the rays of the sun, and from the action of the evening air, and accommodated his dress to the changes in the temperature of the atmosphere. He reduced his diet, and lived sparingly upon tea, coffee, milk, and the common fruits and garden vegetables of the season, with a small quantity of salted meat and smoked herring. His drinks were milk and water, weak claret and water, and weak porter. The advantages of this regimen entirely accord with our observation. In addition to it, and on the ground of experience, we would recommend a very *frequent* and *plentiful* use of mild diluents, sometimes accompanied by a moderate portion of some sound fermented liquor, such as a weak mixture of claret, porter, or cyder and water. With respect to abstinence, it is to be apprehended that mistakes have been committed in some instances, by pushing it too far, and continuing it too long. Where persons are subjected to great exertions and fatigue, during such a malignant epidemic, it cannot, we conceive, be advisable to adopt a regimen calculated to reduce the strength far below its usual degree.

A striking illustration of the good effects of depletion, as a preparative in strangers to encounter the dangers of a baneful climate, is produced by the author, in a communication from Dr. Borland, one of the physicians of the British military hospitals in the West-Indies. "In the beginning of August, 1797, 109 Dutch artil-"lery arrived at Port-au-Prince in the Bangalore transport. The "florid appearance of the men, their heavy cumbersome cloath-"ing, and the season of the year, seemed all unfavourable omens "of the melancholy fate, we presumed, awaited them. It was, "however, thought a favourable opportunity by Dr. Jackson and "myself, to try what could be done in warding off the fever. It "was accordingly suggested to Monsieur Conturier, the chief "surgeon of the foreign troops, and the surgeon of the regiment, "that the whole detachment should be blooded freely, and that "the morning after a dose of physic should be administered to "every man. This was implicitly complied with in a day or two

" after; and at this moment in which I write, although a period " of four months has elapsed, but two of that detachment have " died, one of whom was in a dangerous state when he landed. " A success unparalleled during the war in St. Domingo! It is " true, several have been attacked with the disease, but in these " the symptoms were less violent, and readily subsided by the " early use of the lancet."—" The crew of the Bangalore, on her " arrival at Port-au-Prince, consisted of twenty-eight men. With " them no preventive plan was followed: in a very few weeks " eight died; and at present, of the original number, but fourteen " remain."

It is curious to notice, in connection with the above narrative, a fact quoted by the author from Dr. M'Kitterick—that the heat of the body in strangers, newly arrived in the West-Indies, has been found to be between three and four degrees above that of the temperature of the natives. How far such depletion as that practised in the case of the Dutch artillery at St. Domingo, might be useful at the beginning of an epidemic season in the United States, may be left to the decision of future experience.

In the next place Dr. Rush proceeds to describe the mode of treatment which he adopted in this disease. And we find it, in general, not very different from that pursued in the epidemics of 1793 and 1794.

The cure was, in most cases, begun by blood-letting, when the author was called on the first day of the disease. When employed later, the advantages of this remedy became more precarious, and, in many instances, it obviously did harm. The information derived from Dr. Jackson of the British army, affords strong testimony on this subject, viz. " that he had cured 19 out of 20, of " all the soldiers whom he attended, by copious bleeding, pro- " vided it was performed within six hours after the attack of the " fever. Beyond that period, it mitigated its force, but seldom " cured. The quantity of blood drawn in this early stage of the " disease was always from 20 to 30 ounces." But cases do certainly occur in which this remedy is inadmissible at every stage. The attempt to establish general rules for the use of blood-letting in pestilential diseases is extremely difficult, if not impossible. Every epidemic season, and every individual case justly claims the right of deciding for itself. In one season, the disease may generally assume a high inflammatory character; in another, the power of re-action may be chiefly lost, and the system constantly sink and dissolve under the malignity of a decompounding poison. Similar differences may take place in individual cases. In the one instance, blood-letting may be the anchor of hope; in the other, it may precipitate death. And, besides the extreme cases, there are mixed and doubtful ones, where danger threatens on every side, and a choice of difficulties only remains.

Cathartic remedies were used in this epidemic as formerly. After unlocking the bowels by means of calomel and jalap, our author found no difficulty in keeping them gently open afterwards by more lenient purges. For this purpose, he made frequent use of soluble tartar.

Mercury, exhibited to such extent as to produce ptyalism, was greatly relied upon in this epidemic. Dr. Rush lost but two patients in whom this effect was produced.

The diet and drinks directed by the author in this disease are particularly specified. Great danger is asserted to arise from the premature return of the patient to an animal and stimulant diet. Cordial and tonic medicines were ordered in those states when the degree of debility was urgent, and that mode of relief could be permitted. With an account of the favourable and unfavourable signs the author concludes this part of the work.

We have thus presented a brief abstract of the first part of this valuable work. We are sorry to have omitted the notice of many important particulars which it was impossible to comprize within the necessary limits of this article.

After all the labour and learning bestowed on the subject of Yellow Fever, it is to be regretted that medicine is still so feeble in opposing its ravages. This consideration, we hope, will induce many more of our medical countrymen to lay before the public the fruits of their experience and observations in this destructive disease. And we trust our excellent author will not cease to prosecute his researches, till the dominion of medicine over pestilential fevers shall have explored every mysterious question, disclosed every salutary truth, and arrested the terror and desolation which now mark their epidemic appearance.

(To be continued.)

ART. II. *A Sketch of the Revolutions in Chemistry.* By *Thomas P. Smith.* Philadelphia. *Smith.* 1798. pp. 40. 8vo.

THIS oration was delivered before the Chemical Society of Philadelphia, and published pursuant to a resolution of that body. The sketch is concise, as ten pages of the pamphlet are occupied with titles, dedication, vote of thanks, and introductory remarks. It seems there is a rule of the society, directing the orator to exhibit the progress of discovery in the science of chemistry, within the preceding year. Mr. Smith apologizes for departing from this, and, instead thereof, giving his audience an histo-

rical sketch of the revolutions this branch of knowledge has undergone.

We cannot suppress our satisfaction on learning that this elegant and useful science is cultivated with so much care in a neighbouring city, and that an annual oration is provided for the purpose of bringing, at an early day, to the notice of the members, an account of all new experiments. We trust the example which the author of this oration exhibits will rouse emulation, and stimulate inquiry. And we cannot but indulge the hope that this specimen of his taste for chemical science is only a pledge of more extensive and important researches which the public may expect from the same hand.

When the orator affirms that the early days of chemistry were passed in obscurity, nobody will feel a disposition to differ from him. But when he declares the ancient allegories which appear to have a *physical* meaning, "must be passed over as the unmeaning offspring of ignorance and superstition," he has expressed a sentiment to which historians, scholars and antiquarians will rarely give their assent. The inquirer of true learning and chemical taste will find in the allegories of *Apollo* and *Python*, of *Pan* and *Cupid*, of *Prometheus*, and of several others, something well worthy of being dwelt upon and interpreted. *Lord Bacon* has discussed these things minutely; and it is rather remarkable that our orator had not culled from the *sapientia veterum* of the English philosopher a few flowers to beautify this part of his composition. The countenance given to the idea that the ancient allegories contained discoveries in philosophy and chemistry, by that eminent philosopher and poet Dr. DARWIN, should have taught Mr. Smith, that, in passing over this period of chemical history so neglectfully, he slighted some of the finest subjects for the exercise of his learning and talents.

Every candid reader will condemn, equally with the author, that enthusiastic admiration of antiquity which ascribes to the Priests of Egypt, and their Grecian disciples, a complete knowledge of the physical sciences. He will also be cautious against falling into the other extreme, of saying that they knew nothing about them. While he gives to the moderns their share of applause, he will bestow, with exact impartiality, their just proportion to the sages of earlier times; nor fear that "a smoking chalice," (we do not recollect this) found on the pillar of TRAJAN, (of POMPEY, perhaps, for that is said still to exist in *Egypt*, while the other was erected at *Rome*) "should transfer from Lavoisier to an Egyptian priest, the honour of the pneumatic theory; or, by the bowl of the sacrifice overflowing with blood, painted on a mummy, deprive PRIESTLEY" (not to mention

"HARVEY, MAYOW knew this almost a century before) "of the "honour of the discovery of the oxygenation of the blood." Passing over the scattered and unsettled notions of the old Egyptians and Greeks, Mr. Smith refers the date of scientific chemistry to the tenth century of the christian æra, among the Arabians, and describes its transportation to Europe by the crusaders, together with the origin and progress of alchemy in Asia and the west. He is very short on this period, which may be denominated the *hermetic, or alchemical*, extending, as *we* think, from about the middle of the *seventh* century, when the Alexandrian library is reported to have been destroyed by the Arabs, to the middle of the *seventeenth*, when the learned societies in Europe began to be formed. The history of chemistry, between these two dates, with the experiments on the transmutation of metals, the researches concerning the universal medicine, and the principal inventions during that time, have been sketched out much more particularly and methodically by PETER AFZELIUS ARVIDSSON, in his Chemiæ Progressus, &c. The notions of the scripturalists, theosophists, and rosicrucians, are better arranged by Brucker, in his Histor. Philosoph. Critica. And the chronology of authors and books, to say nothing of BOERHAAVE's catalogue, might have been aided and rectified by consulting ERXLEBEN's Anfangsgrunde der Chemie, Einleit. § 10—11.

Mr. Smith (in p. 17) makes ROGER BACON the discoverer of the composition of gunpowder. This is ascribing to the friar an invention which he never claimed. On the contrary, by consulting a preface to the edition of his *Opus Majus*, by JEBB, in 1733, Mr. Smith will find reason to believe he got his information from the *Liber Ignium* of MARK the GREEK, a manuscript of which is quoted, as being in the collection of Dr. MEAD. The receipt naming the ingredients for gunpowder, and the rubbing of them in a marble mortar, are particularly mentioned. That Bacon knew it, however, appears further from the description in p. 474 of his work, addressed to Pope Clement the Fourth.

After the reign of alchemy and mysticism was terminated by the revolution wrought by phlogiston, it was natural for us, after reading the title-page, to expect a particular history of that controverted substance and the doctrine concerning it. We find, however, no account of Stahl's application of this principle to explain the phenomena of nature, nor any scientific statement of the objections raised against it. An occurrence of so much moment surely merited a full and ample discussion. For, let the followers of the French Nomenclature exult as loudly as they please, it still becomes them to consider whether their songs of triumph do not precede their victory. In our opinion, the whole of facts afforded by the *inflammation* or *blaze* of bodies, tend to show that these are

owing to the presence of *phlogiston or the basis of inflammable air*, an elementary substance, since mis-called *hydrogene*.

It is to be wished Mr. Smith had treated *Mayow* with more justice. If he had perused that philosopher's writings, we have no hesitation to believe, he would have made more respectful mention of him than his being "famous for a number of *ingenious conjectures*." We do not write from quotations of HALLER and *Blumenbach*. We have Mayow's *five* tracts before us. They were printed at the Hague in 1681, and dedicated to Henry Coventry, first secretary of state to Charles the Second. The first is on *salt-petre and its nitro-aëreal spirit*, water-spouts, lightning, &c. the second is on *respiration:* the third is on the respiration of the *fœtus in the womb and in the egg:* the fourth is on *muscular motion:* and the fifth is *on the rickets*. Whoever examines his fifth plate, will see that inverted jars of air and animals within them were used in his experiments: and that he knew the use of the double convex lens, to set fire to substances confined in given quantities of air. Such a man, we think, should be called an *experimental philosopher:* and the more so, as some parts of his apparatus appear to be as well contrived as that of the present day. Mayow published truths for which the minds of his contemporaries were not prepared. His luminous researches were given to the world about a century too soon. They were lost—and the finding them, and making known their contents, constitute one of the many claims of Dr. Beddoes to public esteem.

After mentioning BOYLE and HALES, the orator passes to *Priestley*, to whom he ascribes the discovery of oxygenous air, without mentioning a word of the rival pretensions of SCHEELE. This brings him to the time when the doctrine of LAVOISIER and the antiphlogistians was published, the last in order of the great changes which the science has undergone. He gives a pleasing sketch of the philosophical labours and private life of that promoter of science, and manifests a becoming sympathy and indignation at his untimely and shocking end. It is worth the while to pause and make a remark or two for the purpose of accounting for that excellent philosopher's execution, under the tyranny of *Robespierre*. This man is reported to have been educated from childhood under his uncle the austere bishop of Arras, in all the superstitious and bigotted notions of the Roman church. He was originally destined for the priesthood, but afterwards turned his attention to the law. Devoted to a profession not remarkable for expanding the mind, the prejudices of his early education still clung about the heart of Robespierre, and made him a fit instrument for the degraded priests and royalists to work with. The clergymen and nobles who sighed for the restoration of the former condition of things, soon perceived that the most certain

way of effecting their purpose would be to turn the sword of the revolution against the revolutionists. They accordingly fomented divisions and parties, with all their zeal and influence, for the sake of exterminating as many of the wise and virtuous of their opponents as possible. And by their secret instigation it was, that this ferocious monster acquired so great a degree of power, and for a time committed outrages under the names of liberty and republicanism, which have really rendered those words odious to many of their former friends. Lavoisier was among the victims of fanatical and aristocratical vengeance. Long ago has it been remarked, that cruelty and cowardice inhabit the same bosom. The last hours of Robespierre illustrate this. After he fled from the convention on the accusation of TALLIEN, he was yet strong in the adherence of the Parisian guards; but he had neither courage nor presence of mind to command them. After his flight and capture, he suffered a mean and dastardly death; and with him fell the hopes of his spiritual and temporal supporters. This unspeakable wickedness, fomented and prompted by two of the late priviledged orders, is now charged to the account of the friends of the revolution! With Mr. Smith, we deplore the loss of Lavoisier, a man more to be regretted than any other that has fallen since the beginning of the struggle.

Heartily do we join him in the pleasure he feels on the cultivation of this noble science by the fair sex. We hope the example of Mrs. Fulhame will be followed, and are willing to look for the time when females shall be considered as deficient in one of their most important accomplishments, unless they are chemists. The subject of *elective attractions*—

And we as heartily concur with him in his spirited concluding observations on the utility of diffusing chemical knowledge throughout America; a business we promote as assiduously as we can, and to which we devote regularly a considerable number of our pages.

ART. III. *An Experimental Dissertation on the Rhus Vernix, Rhus Radicans, and Rhus Glabrum, commonly known, in Pennsylvania, by the Names of Poison-Ash, Poison-Vine, and common Sumach.* By *Thomas Horsfield*, of Bethlehem, &c. Philadelphia. *Cist.* 1798. pp. 88. 8vo.

THE botanical and chemical knowledge displayed in this performance, shews the author to have been a student of no ordinary rank. The botanical descriptions indicate a familia-

rity with the plants he describes. The chemical experiments bespeak correctness in contrivance and neatness in execution. Essays like the one before us, not only redound to the reputation of the writer, but to the increase of knowledge. All these plants are natives of New-York, as well as the R. Toxicodendron, mentioned afterwards. Mr. Horsfield first gives a minute description of the three species of Sumach; in the course of which he examines whether the Rhus Vernix, or Swamp-Sumach, is the Varnish-tree of Japan, described by Kempfer, and declares his full conviction that they are evidently the same.

The next division of the work is on the poisonous quality of several species of *Rhus*, particularly the *Radicans* and *Vernix;* wherein, after some observations on the causes which predispose to their action, he considers the poison as received either from an effluvium of the growing plants, from the smoke of the burning wood, from actual contact of the leaves, stems or branches, or from an immediate application of the juice to the skin. This juice he considers capable of being volatilized by heat, and to be exhaled, during the life and vigour of the plant, in the form of a gaseous fluid, surrounding the plant by an *atmosphere of poison.*

There is one remark of the author on this poison, which we think peculiarly worthy of notice. *He compares its effects to those wrought by nitrous (septous) acid.* There is great reason to believe, that the bases of this acid (septon) enters into the composition of many animal poisons, where it derives activity from the oxygene with which it happens to be connected. The same ingredients probably enter into the constitution of vegetable poisons, of whose acid nature some conjecture may be formed by the beneficial effects experienced from the volatile and fixed alkalies (the active ingredient in the ashes), and from oily substances, in curing the eruption and swelling. This forms a striking analogy between this and other poisons, singularly overcome by alkalies and oils. The eruption is ascribed to the local operation of the poisonous vapour on the skin, and a sympathetic fever is found to agitate the heart and blood-vessels, as in small-pox. Is there not an air too, or variolous gas, which is applied to the whole surface of the body? and does not this infected air inflame the skin, like the exhalation from the poison-vines? The similitude of the cases is worthy the attention of physiologists. If solutions of *soap*, or of *sea-salt*, either in the form of brine or of ocean-water, do good in cases of the sumach-fever, it is probably in consequence of their own decomposition enabling their alkaline bases to neutralize the poison. The remaining remedies, recommended by the author, are blood-letting, purging especially by sea-water, cold, and quick-silver administered until it salivates: a practice very much resembling the modern treatment of several other diseases arising from poisons, particularly yellow fever and small-pox.

The experiments which follow (p. 50—60) on the Rhus Glabrum, or common Sumach, go toward the establishment of the following facts: That the saline concretion on the berries is a tartrite of pot-ash; that the gallic acid exists plentifully both in the capsules and leaves, but in a state more fit for economical purposes, in the latter; that it may be advantageously applied to the *dying of black* and the *manufacture of ink*, to the discontinuance of imported galls; and that, for the purposes of *tanning*, its leaves may be substituted for oak-bark. The discovery of these valuable qualities, in dying and tanning, we hope, will be duly attended to by the people of the United States. The leaves and stalks of the common Sumach are already much used in New-York, in preparing sheep and goat skins for morocco-leather.

The author refers to Professor Woodhouse's experiments on persimmon juice. These established, if we recollect right, that the astringent matter of that vegetable substance was composed of *gallic acid and the earth of alum*. Mr. Horsfield endeavours to prove the same in the astringent matter of the sumachs. The remaining experiments in this section refer to the tartarous, acetous and oxalic acids, afforded by the Rhus Glabrum, with speculations on their convertibility into each other.

After some experiments and remarks on the black, yellow, and fawn-colours, produced by the species of Rhus, Mr. Horsfield attempts an analysis of the Vernix and Radicans, and concludes with some observations on the medical properties of the latter, as an incitant and diuretic remedy of moderate powers, when infused in water, and taken *internally:* and recommends the *external* application of both, in certain stages of mania, melancholia, pulmonary consumption, epilepsy, palsy, and other chronic diseases, which, for a long time, have resisted the effects of powerful remedies.

We shall conclude our review with observing, that it is a very desirable thing to multiply copies of dissertations like the present. A number of the graduates in the American universities have published essays highly worthy of preservation. And it might, probably, answer very well for some editor or bookseller to make a collection of them, after the manner of the Amœnitates Academicæ of Upsal, or the Thesaurus Medicus of Edinburgh. The Swedish plan is more enlarged and preferable. Mr. Horsfield's performance would make a valuable article in such a publication.

ART. IV. *An Inaugural Dissertation on Cynanche Trachealis, commonly called Croup or Hives.* By *John Archer, jun.* Philadelphia. *Way* and *Groff.* 8vo. pp. 46. 1798.

IN our first volume, No. I. p. 120, under the article of news, it was announced that Dr. Archer, of Maryland, had discovered seneka snake-root to be an excellent remedy for the croup. This was confirmed by his letter, published in our present volume, No. I. p. 27. The author of the present dissertation is the son of that respectable physician; and the mode of treatment he recommends appears to have been, in a good measure, derived from his father's practice. The discovery of a remedy for so violent a disease, certainly merits communication to the medical world, as extensively and speedily as possible. We shall, therefore, give it our assistance; and, as we have no practical experience of the efficacy of the remedy recommended, we shall give the account of it nearly in the author's own words.

He divides the disease into the *symptomatic* and the *idiopathic.* In the former, the effusion into the trachea, &c. are consequences of previous general diseased action in the constitution; in the latter, which is of no less frequent occurrence, the affection of the windpipe, &c. are primary and local, and the phenomena of fever are mere symptoms.

To moderate and remove the fever in SYMPTOMATIC croup, Mr. Archer recommends *blood-letting*, *purges*, particularly of *calomel*, and *diaphoretics*, especially *tartarized antimony.* He considers *blisters* of little or no service. For removing the preternatural membrane from the trachea and its ramifications, he advises as follows:

"From what little opportunity I have had of observing myself, "and from the extensive experience of others, I take particular "pleasure in recommending a medicine, which has the surprising "powers of dislodging the foreign membrane that lines the inte- "rior parietes of the trachea. When I recommend this medicine, "I am warranted in recommending it with confidence; for its "good effects support my recommendations, and I do conceive "that if administered with that regularity and attention necessary "in the exhibition of all medicines, it will so often succeed, that "others will not be backward in extolling it as highly as I have "myself. The medicine I allude to is the seneka snake-root of "our country.* It was *first* used by my father, about seven or "eight years ago, in a well marked case of croup, far advanced, "and with success, after the common remedies had been sedu- "lously administered without the smallest degree of relief; since

* Polygala Senega of Linnæus.

" that time it has been repeatedly used by him, others, and myself, " with a similar result. I am induced to believe it will scarcely " ever fail, when given in the forming state of the membrane; " and I am confident it will succeed in a majority of cases after a " complete formation of the membrane. The decoction of the " root is the manner in which I have generally seen it used; the " strength must be determined by the physician; it must be so " strong as to act sensibly on his own fauces, in exciting cough- " ing, &c. for in this disease the larynx in a great measure loses " its natural sensibility.* Half an ounce of the root of seneka, " bruised, and simmered in a close vessel, in half a pint of water, " until reduced to four ounces, will probably in most cases be " sufficiently strong. A tea-spoonful of this to be given every " half hour, or hour, as the urgency of the symptoms may de- " mand; and during these intervals, a few drops occasionally, to " keep up a sensible action of the medicine in the fauces, until it " act as an emetic or cathartic; then repeated in small quantities, " and so frequently as to keep up a constant stimulus in the mouth " and throat. By these means, in the course of two, four, six or " eight hours, a membrane is oftentimes discharged by the mouth, " one, two, and three inches in length; sometimes it is swallowed " and voided by stool. Patients who use the medicine should not " be permitted to drink any thing whatever for some minutes " after each dose. The reason must be obvious to all. The " powder has lately been used,† in doses of four or five grains, " mixed in a little water, with effects equally pleasing as the de- " coction, and more so, unless the latter have been carefully pre- " pared.

" To account for the action of the seneka, is a subject necessary " to be inquired into. When taken into the mouth, and swal- " lowed, its pungency is immediately found to be highly diffusive; " it quickly excites an almost continual coughing, with repeated " efforts to swallow, and promotes a plentiful secretion of saliva. " In my opinion, its operation in curing croup is chiefly local. " Does this consist in a discharge being excited between the mem- " brane and the trachea, which, from being less adhesive, the " whole is readily removed by expectoration, in consequence of " the coughing, which is simultaneously induced; or by vomiting, " when the seneka acts as an emetic?—*Dies doceat.*

" Some will no doubt say, it acts in curing this disease merely " from its emetic and diaphoretic properties. It would be suf- " ficient for me to ask those gentlemen, why other emetics and " diaphoretics will not effect the same purpose. I have, in some

* Dr. Geo. Monro's Thes. Inaug. Edinb. 1786.

† By the author's father and brother.

" instances, seen it effect a cure, without either acting as an eme-
" tic, diaphoretic, or cathartic. Does it not then cure cynanche
" trachealis chiefly by acting as a *local stimulant?*

" Should the disease be far advanced, and danger appear pres-
" sing, calomel, as co-operating with the seneka, may be used ad-
" vantageously; it should be given freely internally, and mercurial
" frictions applied externally to the throat and adjacent parts.

" If the limits of this dissertation permitted, I could relate many
" unequivocal cases of the disease, in which the use of the seneka
" was followed by the happiest effects. I shall, therefore, only
" detain the reader with a recital of one to two.

CASE I.

" In the autumn of 1796, I visited Miss F—— L——, about
" three years of age, of a full, gross habit. She had been seized,
" two days previous to my visit, with the usual phenomena of
" symptomatic croup. Her breathing was now wheezing, and
" very laborious; inspiration croupy; cough dry and sonorous;
" pulse quick and frequent; but discovered scarcely any inflam-
" mation; anxiety and restlessness were extreme. I immediately
" ordered the decoction of seneka, as directed in a former page;
" and the use of calomel to open her bowels. The seneka quickly
" excited coughing, with repeated attempts to swallow, and retch-
" ings to vomit. In the course of an hour or two, a quantity of
" viscid phlegm was expectorated, and in a few hours pieces of
" crusted membrane were discharged, a much more easy respira-
" tion took place, and, in sixteen or eighteen hours, I had the plea-
" sure of seeing her as well as usual.

CASE II.

" In the spring of 1796, I saw the son of Mr. J—— E——,
" aged three years. He had had the hives about six months before,
" and was perfectly relieved by the use of seneka and calomel.
" The stridulous respiration was distinctly marked, and the parents
" alarmed, applied as soon as they observed this, as they said,
" *certain token of danger.* I did not find it necessary to do
" more than open the bowels, and make use of the seneka; which
" perfectly restored him in 24 hours."

In order to remove the mucus, or dislodge the membrane from the aspera arteria and bronchia, in cases of IDIOPATHIC croup, he expresses himself in these terms:

" I am of opinion nothing more will be necessary than to
" administer the decoction of seneka, as directed in a former part
" of this essay. It will generally be sufficient, I am confident,

" without any other medicine. The use of mercury may, how-
" ever, as in the symptomatic kind, be sometimes necessary; for,
" in advanced stages of the disease, all our efforts combined are
" sometimes ineffectual in affording relief.

CASE.

" In the winter of 1795, I saw the servant child of Mr. S——
" L——. She had been for two days observed to have a wheez-
" ing, difficult respiration, peculiar dry hoarse cough; but as no
" symptom of fever preceded or attended, as her appetite was not
" impaired, and as she appeared nearly as lively and cheerful as
" usual, no alarm was excited. These symptoms, however, ad-
" vanced to such a pitch of violence on the third day, that death
" appeared to be pointed out, as the inevitable termination of the
" disease. The peculiar inspiration which attends this complaint,
" and which most authors view as a pathognomonic symptom,
" was very striking in the present case. I immediately exhibited
" an emetic; but without any relief. I then purged her with
" calomel, and gave the seneka in the usual manner. In eight or
" ten hours there was considerable relief to the laborious breath-
" ing, and scarcely any expectoration was observed; in eighteen
" or twenty hours, pieces of white membrane were voided by
" stool; and, in thirty hours, I was pleased to leave her as well
" as usual.

" I shall here take the liberty of reciting an extract from a
" letter I a few days since received from my brother, Dr. Thomas
" Archer.

" I have in (I may say) numberless instances effected a cure of
" croup, by seneka alone; and I have lost many children who
" were treated in the common way.

" P——— T———, Esquire's daughter, about four years old,
" was seized with the usual symptoms of croup: in 36 hours after
" seizure I was sent for, and found her labouring under the most
" violent symptoms of that disease, a dry, sonorous cough, with-
" out expectoration. The muscles of the thorax and abdomen
" were thrown into violent convulsive actions, by the efforts of
" difficult respiration. Pulse natural, and appeared hurried, chiefly
" from the difficulty of breathing. An ounce of the root of seneka,
" bruised, was simmered from a pint to half a pint of water; of
" this a tea-spoonful was given every fifteen or twenty minutes.
" In less than an hour, a discharge of viscid phlegm took place,
" in large quantities; respiration became more natural, and, in a
" few hours, the stridulous breathing was entirely removed. Be-
" fore I left her, which was in 24 hours after seeing her, she was
" up, and playing with her playmates.

"I would not," he adds, "give an ounce of seneka as a chance "in the cure of croup, for all the *emetic tartar*, *mercury*, and *can-* "*tharides* in the United States."

We hope this plain and easy mode of managing such an afflicting disorder by a remedy of our own country, may prove as efficacious when adopted by other practisers, as it has been when employed by the author, his father and brother.

ART. V. *An Inaugural Dissertation on the salutary Effects of Mercury in Malignant Fevers.* By *James Stuart.* Philadelphia. *Bradford.* 1798. 8vo. pp. 37.

MODERN practice has greatly extended the use and reputation of mercury. In no instance is this more remarkably exemplified than in the introduction of it in the treatment of malignant fevers. Instead of being dreaded as the means of hastening the fatal tendency of the diseases called putrid, or of producing effects of too harsh and uncontroulable force, it is supposed, by many of the most respectable physicians, to possess powers of appropriate excellence in such cases. Besides the experience of our own country, the testimony of its efficacy derived from the practice of the physicians of the West and East-Indies is so ample, concurrent and positive, as loudly in our judgment to demand attention.

The author of the dissertation before us is deeply impressed with the active and salutary powers of mercury in malignant fevers; and, as the subject is confessedly of the greatest importance, we willingly accompany him through the process of reasoning and illustration by which he endeavours to establish his principles.

In the first place, he offers a definition of the term malignant, as applied to fevers, which he supposes to consist in a great excess of the inflammatory diathesis, or of the violence of stimulus. This is inferred, from the same remote and exciting causes which produce inflammatory fevers, producing malignant fever, when applied in higher degree—from the facility with which inflammatory and malignant fevers are changed into each other—from all fevers, under certain circumstances, assuming symptoms of the highest malignity—and, lastly, from the effects of blood-letting in this state of fever. He therefore defines malignant fever to be *that febrile state, in which there is great over-action in the blood-vessels, or a defect of action, and a disposition to paralysis or gangrene from great excess of stimulus.*

In the next place, the author treats of the *modus operandi* of mercury, when applied to the system. He considers it as an evacuant of fœces, bile, mucus and lymph. The usefulness and importance of its operation in these several respects are treated of with much discernment. He displayed singular intrepidity in examining and tasting the matter of black vomit in several instances; which he found to possess various properties and sensible qualities, and to be derived from different sources; and which also he found not necessarily to be a fatal symptom, but to presage the probable issue of the disease, when the appearances and sources of it are known. Our author likewise supposes mercury to act further by inducing a counter-stimulus in every part of the vascular system, and by saving vital parts by means of a determination to the throat and mouth.

In addition to the modes of action assigned by our author to this remedy, it may not be improper to observe, that, in many cases of malignant fever, it probably operates in a powerful manner by increasing absorption. The dissection of bodies dead of such fevers, commonly confirms the opinion formed by the symptoms of the disease; that congestion, engorgement, and effusion had taken place in vital parts of the system. The vigorous manner in which mercury excites absorption, may be inferred from its efficacy in the different species of physconia, dropsy, &c. After blood-letting to a proper extent, this power is strikingly exhibited in the treatment of hepatitis and hydrocephalus internus, as well as cases of pestilential fever. Some illustration of this action may be drawn from the effects of mercury, when applied to external ulcers; as in this case, a sanious and ill-conditioned discharge is often speedily converted, and probably through the medium of absorption, into a laudable pus. And it is not improbable that the fact, quoted by the author from Dr. Rush, of the swellings of lymphatic glands never suppurating when a mercurial salivation had taken place, may be more simply and naturally accounted for on this principle, than on the vague supposition of mercury possessing the property of counteracting or superseding the operation of the poison thrown on those glands.

In the third place, the author delivers an account of the different modes of applying mercury, and the several means of assisting its operation. He mentions, in detail, with appropriate directions, the modes of introduction by the mouth, by the gums, by frictions, by shoes or socks impregnated with the ointment, by ointment in the form of clysters, and by fumigation.

In the last place, the author delivers an account of the proper treatment of the mouth during a salivation, and the remedies for moderating and relieving it, and obviates the objections to the use of his remedy from supposed injury to the teeth and constitution.

These directions are in the main proper and judicious, but differ not materially from generally received practice.

On the whole, we are pleased to observe the indications of diligent inquiry, careful observation, and good sense, which abound in this dissertation. And we flatter ourselves that the hopes of the public, excited by this performance, will be sustained and exceeded by the usefulness and eminence of the author's future career.

METEOROLOGICAL OBSERVATIONS *for July*, 1798, *made in the Cupola of the Exchange, in the City of* New-York.

Days of the Mon.	Thermom. observed at Sun-rise.	Thermom. observed at 2 P. M.	Prevail. winds. 5 M.	Prevail. winds. 2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	Barometer observed at 2 P. M.
1	70	90	S W	S W	2		29 59	29 52
2	76	94	S W	S W	2		29 57	29 57
3	80	94	S W	S W	2		29 58	29 46
4	72	85	N W	N W	2		29 49	29 49
5	68	78	E	S E	2		29 49	29 44
6	64	78	N	N W	2		29 48	29 60
7	64	76	E	S E	2		29 76	29 79
8	70	76	S	S	2		29 63	29 40
9	63	75	W	S W	2		29 50	29 59
10	65	79	S W	S W	2		29 66	29 68
11	71	65	S	N		2	29 59	29 58
12	64	77	W	S W	2		29 57	29 58
13	64	69	N	S W	2		29 57	29 58
14	60	72	N	S	2		29 60	29 60
15	58	74	E	S	2		29 60	29 60
16	68	72	S E	S E		2	29 60	29 59
17	67	78	W	S	1	1	29 58	29 63
18	69	66	W	W		2	29 59	29 59
19	56	68	N W	N W	2		29 61	29 59
20	57	76	N W	S W	2		29 70	29 75
21	64	80	N W	S	2		29 90	29 90
22	66	83	S W	S W	2		29 85	29 75
23	67	83	S W	S W	2		29 70	29 68
24	70	83	S W	S	2		29 60	29 71
25	72	81	N W	var.	1	1	29 72	29 73
26	70	80	E	S E	1	1	29 73	29 70
27	70	90	S	S	1	1	29 65	29 63
28	77	91	S	S	2		29 60	29 60
29	79	90	S W	S W	1	1	29 60	29 60
30	74	81			1	1	29 64	29 60
31	66	82	W	W	2		29 60	29 65

Results of Meteorological Observations for July, 1798.

					deg.	hund.
Mean temperature of the Thermometer at sun-rise,					69	6
Do.	do.	of the	do.	at 2 P. M.	79	5
Do.	do.	of the	do.	for the whole month,	74	5
Greatest monthly range between the 3d and 19th,					38	0
Do.		do	in 24 hours, on the 1st,		20	0

Seven days it rained, and a great quantity has fallen.
Six days it thundered and lightned in considerable quantity.
One day it hailed, and a very small quantity has fallen.
Coldest day the 19th. Warmest day the 3d.

METEOROLOGICAL OBSERVATIONS *for August*, 1798.

Days of the Mon.	Thermom. obferved at Sun-rife.	2 P. M.	Prevail. winds. 5 M.	2 E.	Clear.	Cloudy	Barometer obferved at Sun-rife.	2 P. M.
1	70	80	S W	S W	2		29 70	29 73
2	68	80	E	S	1		29 80	29 83
3	72	80	W	S E	1	1	29 93	29 91
4	74	81	S E	S		2	29 67	29 59
5	76	84	S W	S W	2		29 67	29 59
6	74	84	W	N W	2		29 59	29 63
7	70	84	S W	S W	2		29 74	29 77
8	72	91	W	S W	2		29 75	29 69
9	76	96	S W	S W	2		29 60	29 52
10	78	90	S W	S	2		29 47	29 40
11	78	89	S	S E	1	1	29 40	29 47
12	74	86	var.	N W	1	1	29 63	29 71
13	74	83	N E	S	1	1	29 80	29 84
14	74	78	E	S		2	29 82	29 80
15	74	82	var.	S W	1	1	29 80	29 84
16	75	85	S W	S W	1	1	29 81	29 80
17	75	90	S W	S	1	1	29 77	29 70
18	76	90	S		1	1	29 66	29 66
19	72	84	N E	S W	2		29 70	29 80
20	74	83	E	S E	1	1	29 80	29 79
21	77	87	S W	S	1	1	29 72	29 67
22	76	84	N W	N E	1	1	29 63	29 71
23	65	76	N E	E	2		29 92	29 92
24	66	80	S W	S W	2		29 82	29 71
25	76	91	S W	S W	2		29 65	29 63
26	79	93	S W	S W	2		29 62	29 59
27	77	85	W	W	2		29 75	29 70
28	69	76	W	S W		2	29 61	29 60
29	67	76	W	N W	2		29 61	29 55
30	67	80	S	S W	2		29 62	29 58
31	68	81	var.	W	2		29 61	29 65

Results of Meteorological Observations for August, 1798.

Mean temperature of the Thermometer at fun-rife, deg. 78 o hund.
Do. do. of the do. at 2 P. M. 83 o
Do. do. of the do. for the whole month, 78 o
Greateft monthly range between the 9th and 23d, 31 o
Do. do. in 24 hours, on the 9th, 20 o
Nine days it rained, and a great quantity has fallen.
Fifteen days it thundered and lightned, and in great abundance.
Coldeft day the 23d. Warmeft day the 9th.

METEOROLOGICAL OBSERVATIONS *for September*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. 6 M.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	68	80	E	S E	2		29 76	29 80
2	67	77	E	E	2		29 87	29 87
3	61	71	E	S E	1	1	29 80	29 75
4	63	74	E	S E		2	29 62	29 58
5	69	74	S W	S W	2		29 39	29 39
6	66	71	E	E	1	1	29 43	29 43
7	64	75	E	S E	1	1	29 58	29 60
8	63	70	S W	S W	1	1	29 60	29 60
9	60	70	E	E	2		29 66	29 66
10	63	77	N	E	2		29 67	29 67
11	66	77	W	N	2		29 76	29 76
12	63	71	E	S E	2		29 97	30 0
13	61	73	E	S	2		29 90	29 83
14	63	76	S	S		2	29 77	29 73
15	68	79	S W	S	1	1	29 75	29 75
16	70	80	S W	S W	2		29 75	29 72
17	69	82	S W	var.	2		29 72	29 74
18	70	76	E	S E		2	29 78	29 78
19	73	79	S	S	1	1	29 78	29 78
20	70	79	E	S E	1	1	29 78	29 78
21	74	76	S	S W	2		29 60	29 67
22	59	72	N W	N W	2		29 68	29 68
23	62	74		S	2		29 63	29 62
24	62	74	N	N W	1	1	29 62	29 62
25	55	64	N	N W	2		29 51	29 45
26	50	64	N W	N W	2		29 70	29 68
27	61	71	S W	S E	1	1	29 60	29 47
28	50	59	W	N W	1	1	29 61	29 56
29	40	52	N W	N W	2		29 75	29 77
30	42	64	W	S W	2		29 82	29 77

Results of Meteorological Observations for September, 1798.

Mean temperature of the Thermometer at sun-rise, deg. 60 0 hund.
Do. do. of the do. at 2 P. M. 70 0
Do. do. of the do. for the whole month, 60 0
Greatest monthly range between the 17th and 27th, 11 0
Do. do. in 24 hours, on the 1st and 22d, 12 0
Eight days it rained, and a small quantity has fallen.
Six days it thundered and lightned.
Coldest day the 27th. Warmest day the 17th.

A RETURN *of Patients admitted to the Care of the New-York City Dispensary, from the 1st of July to the 1st of October, 1798.*

JULY.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed, &c.	Result.	
Worms	3	3				Admitted	35
Wounds	2	2					—
Amenorrhœa	1	1				Cured	33
Remitting Fever	2	2				Died	1
Intermitting Fever	1	1				Hospital	1
Rheumatism	3	3					—35
Indigestion	1	1					
Head-ach	1	1					
Pneumony	3	3					
Canker Mouth	1	1					
Opthalmia	2	2					
Incipient Phthisis	2	2					
Diarrhœa	5	4		1			
Sore Legs	1	1					
Hiccough	1	1					
Mumps	2	2					
Dysentery	1	1					
Cholera	3	2			1 Hosp.		

AUGUST.

Rheumatism	3	3				
Cholera	4	4				
Dysentery	8	7		1		
Phrenzy	1				1 Al. H.	
Gonorrhœa	1	1				
Sore Legs	2	2				
Opthalmia	1	1				
Dyspepsia	2	2				
Small-pox	1			1		
Bilious Fever	24	20		2	2 Bellev.	
Canker Mouth	1	1				
Atrophy	1	1				
Worms	4	4				
Lumbago	1	1				
Jaundice	1				1 Hosp.	
Contusion	1	1				
Parturition	3	3				
Diarrhœa	10	10				
Intermitting Fever	2	2				

AUGUST continued.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed, &c.	Result.
Herpes	10	10				Admitted 96
Syphilis	2	2				—
Abscessus	2	2				Cured 84
Fistula in Ano	1	1				Died 6
Pneumony	1	1				Relieved 1
Apoplexy	1			1		Bellevue 2
Dropsy	2	1			1 Hosp.	Hospital 2
Paronychia	1	1				Alms-H. 1
Dyspnœa	1			1		—96
Film	1		1			
Wounds	1	1				
Gastrodynia	2	2				
SEPTEMBER.						
Bilious Fever	193	167		12	11 Belle. 3 Hosp.	Admitted 228
Dyspepsia	7	7				Cured 200
Cholera	2	2				Reliev. 1
Hæmaturia	1	1				Died 13
Diarrhœa	2	2				Bellev. 11
Herpes	3	3				Hospit. 3
Worms	4	4				——228
Abscess	3	3				
Syphilis	4	4				
Rheumatism	1	1				
Dysentery	2	2				
Lumbago	1	1				
Hæmatemesis	1			1		
Paralysis	1		1			
Bilious Colic	1	1				
Dropsy	1	1				
Scald Head	1	1				

SUMMARY.

Whole number of Patients admitted into the New-York City Dispensary, from the 1st of July to the 1st of October, 1798, 359

Of this number have been *cured*,	317
relieved,	2
have *died*,	20
Removed to the Hospital,	6
Alms-House,	1
to Bellevue,	13
	359

HUGH M'LEAN.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Pestilence.

IN recording the history of diseases since our last number, we perform a melancholy task. The Yellow Fever, whose ravages within a few years past had been so often deplored, has lately renewed its visitation in the United States to a greater extent, and with multiplied horrors. The northern, southern and western parts of the Union have chiefly escaped this calamity. The commercial towns, situated to the eastward of the bay of Chesapeak, and the river Susquehanna, have principally suffered. Portsmouth in New-Hampshire, Boston, New-London in Connecticut, New-York, Philadelphia, and Wilmington in the State of Delaware, besides some other places in inferior degree, have largely shared in this epidemic. Portsmouth and Petersburgh in Virginia, are the only places west and south of the Chesapeak and Susquehanna, so far as we yet know, which have been attacked with violence. In all these towns, the sickness and mortality have been great; and, in addition to these, the consternation and flight of the inhabitants, and the derangement and suspension of business, have greatly enhanced the public distress.

Although June and July, with the exception of a few days, had been moderate, cool, and rainy, the weather entirely changed in August, and exhibited a degree of heat, in point of duration and steadiness, if not of severity, very uncommon in this climate. Throughout a great part of September, the heat continued with little abatement; much of October was unseasonably warm; and frost did not take place till a later period of the season than usual.

This epidemic generally appeared early in August; through the remainder of which month, September, and chief part of October, it continued to rage with much violence: in the latter end of October, and in some instances earlier, a sensible abatement had taken place, and in the first weeks of November, the disorder entirely ceased.

From Portsmouth in New-Hampshire, little authentic or particular information has yet come to hand. Report states that the number of deaths did not exceed one hundred, and that the prevalence of Dysentery at the same time with the Yellow Fever, served greatly to swell the amount of mortality.

In Boston, we are told, the disease was nearly extinguished by the 20th of October. The number of deaths is said to have been about 140. The terror and flight of the inhabitants, and the interruption of business took place in this town to a considerable extent.

New-London exhibited a scene of great mortality for several weeks. The alarm and desertion of the town were very great. The amount of deaths we have not been able to ascertain.

In New-York this pestilential disease began early in August, and did not terminate till near the middle of November. A large proportion of the inhabitants, some say two thirds, quitted the town. Great numbers, who remained, deserted the more unhealthy parts of the town, and took refuge in the districts of higher ground and purer air. The wharves and warehouses on the east river were generally abandoned; the shipping was transferred to the north river, and a great portion of business was transacted on that side of the town. Notwithstanding all these circumstances of retreat from infected situations, more than 2000 persons are supposed to have fallen victims to the disease.

Philadelphia stood foremost in the distress and mortality produced by this pestilence. Forty thousand of its inhabitants are said to have left the city, and a large proportion of them at a very early period of the epidemic—a number greatly beyond that which had taken refuge in the country on former occasions. Still, however, the number of deaths amounted to 3446. From Philadelphia the disease was spread along the shore of the Delaware, and raged, as we are informed, with great violence at Chester and Marcus Hook.

Wilmington, in the State of Delaware, though considered a place, ordinarily, of remarkable health, became, on this occasion, one of the seats of this destructive epidemic. In this comparatively small town, although greatly deserted, upwards of 250 persons perished of this disease; a much greater number, according to its rate of population, than died at any other place in the United States during the late season.—The fever also prevailed at the towns of Newcastle and Duck Creek, in the State of Delaware.

Time enough has not yet elapsed to receive from places at a distance any minute accounts of this epidemic. We hope to be able, in some future numbers, to offer details on this subject of a more satisfactory kind. Great zeal is beginning to manifest itself in Philadelphia and in this city, to inquire into the origin and causes of this epidemic, and the best means of obtaining security against its return. The progress and result of these important exertions will be particularly stated in our future numbers.

With respect to the phenomena of this epidemic, we are only, at present, enabled to state what fell under our observation in this city.

In a succinct and rapid sketch, which is all that can be attempted on the present occasion, it will not be expected that we should deliver a minute description of the disease. The ordinary appearances of Yellow Fever are familiar to every medical reader. The peculiar character of this epidemic, as distinguished from the same disease appearing in a different season, and such extraordinary phenomena as may tend to develope and illustrate its nature, will especially deserve notice.

Every grade of disease, from the mildest febrile affection to the most malignant and pestilential, was exhibited in the course of this epidemic. Except in a few situations, the number of mild cases greatly predominated over the malignant. Some assumed the character of intermittents, and yielded to a very slight treatment. Many more appeared under the form of remittents, without any symptoms of malignity, and speedily gave way to the remedies appropriated to such cases.

The more virulent cases of this epidemic seem to be reducible to the following heads. 1. The instances of sudden fatal termination, where the pestilential poison appears to extinguish the vital principle by a direct attack upon its source, or by arresting its distribution through the system. Under this head may be comprehended the cases of sudden death, the attacks of the disease in the form of apoplexy and syncope, great and sudden prostration of strength, giddiness, staggering, stupor, coma, &c. 2. The instances of more protracted illness, with little force of reaction, where the pestilential poison seems more gradually to undermine the vital energy, and, by fastening itself on the stomach and other portions of the alimentary canal, to inflame, corrode, decompound, and dissolve these viscera, and, at the same time, to diffuse its virulent operation over the whole system. In this division will be included the cases which display universal but moderate languor and debility in the early stage, followed by discolouration of the skin, scorbutic blotches, hæmorrhagies, low delirium, convulsions, &c. and which seem to terminate in organic decomposition, indicated by the burning heat and pain of the stomach, the black vomiting, and finally by the appearances on dissection. 3. The instances marked by powerful reaction, where the pestilential poison is supposed to induce the inflammatory diathesis, leading to violent determination to the brain or other vital viscera, and at length to derangement of organic texture. Under this head will naturally fall the cases of violent febrile commotion, attended with great heat, pain of the head, flushing of the face, redness of the eyes, fierce delirium, &c. and exhibiting, after death, to the anatomist, the appearances of congestion, engorgement, and effusion.

It will not be supposed that these distinct forms often exist in a simple state. Such simplicity is chiefly the result of mental abstraction. In the epidemic we describe, those forms were in-

finitely combined, intermixed, and confounded, and frequently left no ground of distinction, but in the predominance of one or the other.

It is well known, that in different epidemic seasons, one or more of the above stated forms of the disease have chiefly prevailed, and given it a peculiar character. Hence we hear of the epidemic being more or less malignant in some seasons than in others; and of remedies failing at one time, which had possessed great efficacy at another.

In the epidemic which we now describe, the first of the above-mentioned forms of the disease, so far as we know, did not very often occur. The second and third, sometimes more simple, but oftener variously combined, formed the great mass of the more virulent cases.

To give additional proof of the pestilential nature of this distemper, it may be sufficient to mention, that cases of *bubo* and *anthrax* were observed during its prevalence in New-York this year; and in one person, a patient in the State Hospital, the prevailing symptoms, for twenty-four hours preceding death, were spasms of the pharynx, neck, back and arms, exhibiting the combined horrors of tetanus and hydrophobia.

To give the reader some idea of the condition of the atmosphere, it is highly worth the while to state some of its operations upon other things than living bodies. Foggy weather, with easterly winds, had prevailed between the middle and 21st of September. The pestilential matter seemed to be rendered more active by conjunction with water. The mortality among the people increased. At the same time, it was observed that the iron-railing in the front of houses was covered with a thick and unusual coat of rust; and the smooth and bright parts of the pump-handles in the streets were, during a few hours of rest in the night, exceedingly corroded by every drop of moisture which fell upon them. The leaves of trees on which this eroding moisture had settled, often became spotted; and between this time and the appearance of frost, these spots turned to mortification. At this time, white cotton garments spread to dry after washing, acquired such stains and spots by being suffered to hang out during the nights when this mist prevailed, as to be indelible afterwards by twice boiling in alkaline ley. This rusting of iron and spotting of cotton took place even in the College-yard, one of the most elevated, airy, and healthful situations in the city. After the disappearance of the fog, a saline efflorescence, supposed to be nitrous, was observed on the pavement of many places, particularly Front, Water, and Pearl streets. So virulent and abundant was the venom, that some inspectors of pot-ash, and some soap-boilers, though usually exempted in former plagues, now sickened, and several of them died.

Mineralogy.

The Committee of the AMERICAN MINERALOGICAL SOCIETY have lately published an advertisement, the object of which was to collect into one view all the information that is scattered through the union, relative to the means our country possesses of furnishing objects immediately requisite for national defence. They now take the liberty of offering some remarks to their fellow-citizens, upon the more general objects of their institution, and the means of improving the science it is intended to cultivate.

If the bowels of the earth had furnished no riches but gold and silver, it were better, perhaps, that the hands of men had never penetrated them. But when we remember that iron, the parent of arts and of civilization; that mercury, so useful in experimental philosophy, medicine and the arts; and that sea-coal, the loadstone, and so many other objects without which society could not exist in its present state, are the fruits of mineral labours, we shall be convinced that the world is almost as much indebted to the interior of the earth for improvements, as to its surface for subsistence. Mineral substances enter directly or indirectly into almost every manufacture, whether of objects ornamental or useful. Glass, porcelain, gunpowder, certain of the most powerful acids, some of the most elegant and permanent of our colours and dyes, and the most powerful class of remedies known to the medical art, are chiefly of this class. How various are the forms, and how multiplied are the uses, of the instruments that art has made from the perfect and imperfect metals! Some of these, by their strength and durability, are formed to apply or to resist the utmost efforts of mechanic power. Some that are equally durable yield pliably to the hand of art, and assume, with readiness, whatever forms convenience dictates. There are those that are ductile almost beyond our conception, and that receive a polish, which is proof against the ravages of time—Some yield readily to the heat of the furnace, while others defy the attacks of artificial fire. The metals, by their different degrees of strength, elasticity, durability, weight and incorruptibility, and other mineral substances, by the still greater number and importance of their qualities, are fitted for uses as various as the imaginations of men, and as important as their wants.

A nation which is deficient either in mineral riches, or in a knowledge of them, is wanting in the most essential requisites of political and commercial independence. The United States have been little explored; but they have given indications of possessing objects to reward the researches of the mineralogist in greater abundance than most other countries. They contain vast chains of ori-

ginal mountains—vast tracts of country, of a secondary and of an alluvial formation—extensive plains, once the beds of lakes, and mountains broken to their centre by the convulsions of nature—it can hardly happen in the course of things, that such a country should not be abundant in mineral resources.

The discovery and improvement of these resources generally, is the object towards which the society wishes to direct its labours. It is hoped and believed that every description of citizens will be inclined, as occasion shall offer, to aid the undertaking. The owners of land will gladly assist in making discoveries which may inhance the value of their estates; the actual cultivator of his farm will find an interest in the discovery of marles, clays, chalk-beds, and whatever else may be useful for manure; the man of leisure, if such there be in America, will find an elegant amusement in the collection of a cabinet, and the man of science an interesting employment in the study of it.

Encouraged by these reflections, the society beg leave to mention to their fellow-citizens, some ideas relative to the means of improving the knowledge of mineralogy in this country, with little expence or labour. They suggest the following ideas, and, at the same time, are ready to consider, with due attention, any different ideas that may be suggested by others:

1st. Societies might be formed in different parts of the United States, and most conveniently in towns which have the means of a ready and cheap communication with the country. These societies might solicit the public in general, and the personal acquaintances of the members in particular, to furnish them with specimens of the products of all mines, ore and coal-beds, and of marbles, marles, clays, limestones, fossils, shells and wood, petrefactions, crystals, and, in general, of all minerals and fossils that appear worthy of attention.

It frequently happens in this country, that farmers discover in ploughing, and by other means, many objects well worthy of being examined and preserved, but which are forgotton and lost for want of proper persons to examine them, and of a cabinet to place them in.

2dly. It would greatly tend to illustrate the mineralogy of our country, and geology in general, if, with every sample received, there should be taken as exact an account as may be of the circumstances of the place where it was found, and of any facts explanatory of its natural history. A paper containing a short summary of such information might always be annexed to, and accompany the specimen.

3dly. The societies formed might keep up a regular correspondence, and might send each to all the others, parts of the specimens they receive, together with the written accounts of them, when-

ever those specimens are of a kind, and in sufficient quantity to be divided. It would also be useful to analyze parts of the specimens received, and to communicate the result. We conceive also, that it would not be necessary to confine our cabinets too strictly to objects merely *mineral:* whatever tends to illustrate the history of the earth and of its component parts, might, perhaps, be admitted with advantage.

A correspondence of this kind, if actively pursued a few years, would furnish our country with several valuable cabinets of mineralogy at little or no expence. These would be repositories where persons inclined to investigate such subjects, either for amusement or profit, might resort for information. They would enable the inhabitants of any one part of the union to take a view of the mineralogy of the whole United States.

The Chemical Society of Philadelphia have laudably set the example, by soliciting information upon the resources of our country, for furnishing an article of great national importance. We also solicit the correspondence of societies and of individuals, upon all subjects mentioned in this address, and in our former advertisement. In particular, the society requests of farmers, miners, travellers, and collectors of private cabinets, any specimens of minerals and fossils which it may be in their power to furnish, together with any intelligence respecting them; and the society will not fail, on its part, to furnish any information in its power, derived from essay, analysis, or otherwise, and to communicate it, with freedom and with pleasure, to societies and to individuals.

By order of the Society,

SAMUEL LATHAM MITCHILL, *President.*

E. H. SMITH, *Secretary.*

New-York, August 8, 1798.

Cure of Chancre from Venereal Contagion by Alkalies.

While experiments are making upon an extensive scale, and with various success, on the cure of syphilis by nitric acid, it is deemed peculiarly proper to inform the advocates of that remedy, that venereal ulceration has also been removed with surprizing quickness, by the local application of the common vegetable fixed alkali, or the carbonate of pot-ash. The following experiment may serve to confirm the doubts of such gentlemen who disbelieve the wonders said to be wrought by the nitric acid; and, at the same time, to give new matter of reflection to those who have ascribed to it something like a specific mode of action. A gentleman, a few days after impure coition, felt an itching on the preputium penis, which soon became ulcerated. As soon as the chancre was discovered, it was cauterized with the septite of silver (lunar caus-

tic), and dressed with ointment strongly impregnated with the sæpitite of quick-silver (red precipitate of mercury).

Notwithstanding repeated dressings, and the strictest observance of cleanliness in all respects, the ulcer continued to spread, and had invaded a considerable space on the prepuce. Finding it yield in no degree to these local applications, recourse was had to mercurial friction; which was performed by rubbing the blue ointment in considerable quantities upon the legs and thighs. Before a salivation came on, the appearance of the ulcer mended, and by degrees it healed. A few days after, the same gentleman having repeated his impure caresses, was troubled with a new chancre, caused apparently from fresh poison breaking out near the frænum. Immediately on its discovery, while yet exceedingly small, and not larger than to contain a pin's-head, it was touched with lunar caustic, and dressed with precipitate ointment, as the former had been, and, in a constitution now charged with mercury, it was expected a cure would be very easy and expeditious. This, however, was not the case. The chancre continued to enlarge, to inflame, and to become more and more troublesome; insomuch, that it was apprehended there would be a necessity for repeating the mercurial friction. But before recourse was had again to this tedious and troublesome remedy, it occurred to me, from the analogy of volatile alkali in curing bites of venomous serpents, and of the fixed alkali and lime in overcoming those acid products of putrefaction which poison the atmosphere, and induce endemic distempers, that it was worth the while to try the effects of an alkaline application to subdue the virus of syphilis: accordingly, the ulcerated surface was covered with some deliquescent salt of tartar. On being first applied, it excited severe smarting; which, however, lasted but a short time. It was dressed with lint, and, on examining it some hours afterwards, it looked better, and appeared to spread no more: after a second application of pot-ash, the appearance of the ulcer was apparently changed for the better; on a third application it dried up, healed entirely, and has been well ever since. Whether in this case the pot-ash operated upon the solids, and introduced in them a new action incompatible with the morbid action, or whether it produced its effects by neutralizing the contagious matter on the surface of the sore, are questions which the physiologist may consider and explain at his leisure. This experiment shews, at least, that there is nothing specific in the action either of mercury, or of nitric acid, on venereal ulcers. Abundance of instances of chancre, cured by alkali, have since occurred in the New-York Hospital.

S. L. M.

November 10, 1798.

A Committee of the Medical Society of New-York, consisting of Messrs. Tillary, Rodgers and Mitchill, were chosen at a meeting of that body, lately held, for investigating the origin, cause and prevention of the pestilential distempers which so terribly afflict New-York, and the other cities and towns in the United States. We hope the report of the Committee will be made up before the publication of our next number. As the Committee have been promised the aid of the municipality, and of the health-office, their means of gaining information would appear to be greatly facilitated, and an opportunity afforded of laying before their fellow-citizens a valuable state of facts.

A new variety of Iron-ore of the Argillaceous kind, and resembling Basaltes.

The specimen of columnar iron-ore in my collection is from Germany, and corresponds very well with Mr. Kirwan's second variety of his first family of argillaceous iron-ores. (2 Elements of Mineralogy. Dublin. 1796.) I knew of no other iron-ore of that character until a few months ago. As I was walking on my farm upon Long-Island, surveying the various mineral productions that lay thick under my feet, I observed a small spot that appeared to be paved with stones of a regular figure. On taking up some of them, and examining them, they were evidently of the same constitution with the common argillaceous iron-stone, which lay scattered about in rude lumps. They were, however, of a singular shape. They were about four inches long, and stood erect, side by side of each other, in a stiff loam. Each of them had five sides and five angles; and though not exact pentagons, were readily distinguishable in most of the specimens, from one end to the other. This shape was most perfect at the two ends, which were considerably larger than the middle part, and about one inch and a half across; so that when a specimen of this ore was grasped in the hand, it had some resemblance of a double-headed pestle. In some, however, four sides only were to be traced.

The number of these figured bodies was about thirty-six, though not all of them equally perfect. And they evidently had been formed from a solid circular mass of argillaceous iron-ore of about two feet and five inches in breadth, and four inches in thickness at the central parts, and becoming thinner towards the edges. In the natural fracture of the stone, the fragments took upon themselves these regular forms, very much resembling basaltes; and, like basaltes, though *figured*, they evidently are not *crystallized*, for they are as perfectly terrigenous and opaque as any argillaceous ore of iron whatsoever.

I brought away some of the pentagonal pieces, and could easily

get more of them; for in taking out the few that I brought away, I disturbed the rest as little as possible.

These specimens go very far towards deciding the dispute, if any doubts still remain, about the *igneous* or *aqueous* origin of basaltes. They support, by the most powerful evidence, the *Neptunian* origin of that kind of figured bodies, and are directly opposed to the *Plutonic* system. The specimens before me prove that argillaceous iron-ore, which nobody has supposed to be a volcanic production, can take on a basaltic figure. With BERGMAN, WEIDEMAN and KIRWAN, I am inclined to believe the weight of testimony is opposed to the formation of basaltic columns by FUSION, and that the true manner in which many, if not all of them, have been produced, is in the MOIST WAY. This new proof, added to Mr. Kirwan's very able paper on *traps* and *basaltes*, I think, settles the controversy in his favour. S. L. M.

We are happy to announce, that Mr. Webster's History of Pestilential Diseases will be put to press in the course of next month.

The design of this publication will be to lay together the principal facts which regard the origin, progress and declension of pestilential epidemics—and the remarkable phenomena of the natural world, such as unusual seasons, contagious diseases among animals, appearance of insects, and other events which may possibly have some connection with the causes of pestilence; with a view to arrive, if possible, to some knowledge of the sources from which proceed the wide-wasting diseases which afflict mankind. A great number of curious facts are collected, and it is believed they will throw much light on this subject, so interesting to the commerce of our cities, and the lives and happiness of men.

FOREIGN.

HAVING in former numbers of this work given all the authentic information which had reached us, concerning the use of nitrous acid in syphilis, we hold ourselves responsible for the communication of every thing interesting on this subject.

Mr. William Blair, surgeon of the Lock Hospital, has published the first part of the work he some time ago projected, under the following title: ESSAYS *on the* VENEREAL DISEASE *and its* CONCOMITANT AFFECTIONS, *illustrated by a variety of Cases. Essay* I. *Part* I. *On the Antivenereal Effects of Nitrous Acid, oxygenated Muriate of Pot-ash, and several analogous Remedies, which have been lately proposed as Substitutes for Mercury.*

Some weeks before the publication of this work, Mr. Blair addressed the following letter to the Editor of the Monthly Magazine:—

"Having been disappointed of seeing the collection of medical "facts, which a correspondent of yours has long since promised "to publish, I have committed the result of my own observa- "tions and experience to press. This essay will probably ap- "pear in the beginning of next month; and, I hope, will exhibit "an impartial view of the *whole evidence, as it now stands, both for "and against the new plan of treatment*; including a variety of cases "which have been recently communicated to me, by different "practitioners in London.—As I have no favourite theory to sup- "port, it will be my first wish and aim to arrive at the truth, "whithersoever it may lead me. At some future period, I shall "endeavour to supply what may appear to be deficient, and cor- "rect what shall be pointed out as erroneous."

In the Monthly Magazine for August of the present year, we find the following notice concerning Dr. Beddoes's long expected work:—

"Dr. Beddoes's collection on '*Syphilis*,' which is so anxiously "expected, has been delayed for West-India and other interesting "intelligence. A considerable part of it is however printed off, "and the work will now make its appearance in a few weeks."

As connected with this subject, we notice the following case:

"Mr. Warner, apothecary, in Fore-street, (London) on Feb. 22, 1797, after an attendance of a few days on a patient who died of a malignant fever, was suddenly seized with a vertiginous affection of the head, accompanied with sickness at the stomach, and followed by violent vomiting. These symptoms were succeeded by a fever; during the continuance of which, considerable pain was felt in the region of the abdomen, particularly about the left hypochondrium; and, in a few days after the abatement of the fever, symptoms of jaundice appeared. The tunica conjunctiva of the eye, and the whole surface of the body became of a very deep yellow colour; the stools were of a clay-like appearance, and the urine was very much impregnated with bile, depositing at times a considerable sediment. There was a sense of pain and stricture about the præcordia, accompanied with a considerable degree of tension of the abdomen: and the pain in the left hypochondrium frequently returned. The breathing was sometimes very much affected: the heat of the skin was increased and seconded by a desquamation of the cuticle, and such a degree of itching as proved very troublesome. The state of the pulse was not much affected at any stage of the disease. These symptoms continued

for several months, attended with great languor and debility, an indisposition to motion, together with considerable anxiety of mind.

"As in the course of the disease a variety of symptoms occurred, so different medicines were employed, according to the different circumstances of the case. The bowels were kept open by aloes, rhubarb, and soap. Different bitters were employed: gentian and columbo were frequently used. Myrrh and steel were taken with a view to their tonic effect, and for the mitigation of pain, opium was repeatedly administered.

"Calomel was frequently used, but the state of the bowels sometimes rendering the use of it improper, mercurial frictions were substituted in its room.

"After the use of various medicines, without any important advantage being produced, the *nitrous acid* was taken in the quantity of a dram every day. During the use of this medicine, the various symptoms gradually abated; the yellow colour of the eye and of the skin grew fainter; the tension of the abdomen diminished; the pain and stricture about the præcordia abated; the strength gradually returned, and the appetite was much improved. No inconvenience arose to the stomach or bowels from the use of the acid, till after it had been taken for some weeks, when the patient felt a pain in his stomach; for the relief of which he took a few grains of kali preparatum, and repeated the dose twice or thrice in the course of the week. Whilst it was judged proper to mention this circumstance, it is equally necessary to observe, that the small quantity of the kali taken can hardly affect the conclusion which may be drawn respecting the advantage of the nitrous acid in this instance.

"This report will probably bring to the recollection of the medical reader, the experiments of Mr. William Scott, of Bombay, and the conclusion which he draws concerning the effect of the nitrous acid on the resinous base of the bile, and the resemblance of the effects of this medicine to those which generally occur in the use of mercurials."

"Vauquelin has made an analysis of the emerald of Peru, in which he recognizes the new metallic substance discovered by himself, in the red lead of Siberia. It is to this metal that the emerald owes its green colour. Vauquelin designs to repeat his analysis, to determine, with greater precision, the exact proportion of the several component parts."

"Professor Lampadius has made several very interesting experiments to ascertain the combustibility of the diamond. This stone being laid upon red-hot coal, and exposed to the effects of

vital air, was totally decompounded without leaving the smallest particle. As soon as the diamond had attained to a thorough glow, during which it was observed to swell, it began as obviously to decrease in size. All this time vapours exhaled from it, till, after the expiration of five minutes, it totally disappeared. That this was not the effect of mere evaporation, but that actual combustion took place is demonstrated by the circumstance, that as soon as the diamond was brought to a thorough white glow, it continued to burn of its own accord, and became paler when the coal discovered a visible flame, and was not cooled by the torrent of vital air."

"A very valuable treatise on *metallic irritability*, involving a discovery which promises to prove highly beneficial to the interests of humanity, has been lately published in German, by C. C. Creve, Professor of Medicine at Mayence. M. Creve maintains, from a number of experiments made on the corpses of persons just deceased, as well as on animal bodies, that the symptoms of putrefaction do not constitute an infallible evidence of the actual death of the individual; and that the application of the principle of *metallic irritability* will, in *all* cases, establish the fact of life or death beyond the possibility of mistake. By this means, the danger of *premature inhumation* may be effectually obviated. The work is accompanied with appropriate and illustrative plates."

"Mr. Fabroni has discovered, that a juice expressed from the leaves of the socotorine aloe yields, by simple exposure to the air, a very deep and lively violet-purple dye, which is not acted upon by acids, alkalies, or oxygen gas. He thinks it may be highly useful in forming a pigment for miniature painting; and also, dissolved in water, for dying silk, which it will effect without the use of a mordant. Though this aloe is a native of a tropical climate, it is supposed that it might be readily cultivated in the south of Italy."

"The new metal *titanium*, discovered by Professor Klaproth, has been since examined by several able chemists. Professor Lampadius, of Freiberg, has effected the analysis of the titanite of lime, by means of borax and common glass; it was, however, only reduced into metallic leaves of a darkish copper colour. It appears to have a strong affinity with oxygen, being immediately converted into a white oxyd, and afterwards into a globule of blue glass, on heated charcoal, by means of vital air. A more complete reduction of this metallic substance has been effected by Professor Klaproth and Mr. Hecht, jun. directors to the laboratory of the mining department at Paris; both of whom obtained a regulus of a gold colour."

"*French Aërostation.*

"Citizen Garner has ascended in his balloon for the ninth time, in the last two of which he has been accompanied by a young lady of the name of Celestina Henry. They made the park of Mousseaux (the villa of the late duke of Orleans) the place of departure. The account this aëronaut gives of the incidents which occurred in his several voyages to the upper regions, contains a great deal of novel and interesting information. His highest point of ascension he judges to have been three thousand toises, or six thousand yards, equal to almost three miles and a half. Of this fact, however, he could not be very exact, as the preceding day he had the misfortune to break his barometer on descending at Eganville. But he judges by the quantity of ballast he threw out, by the dilatation of the balloon, by the whistling noise of the *gas* as he let it escape through the tube, but, above all, by the extreme cold he felt, and especially by the great numbness of his fingers. In passing through the different currents of air, or rather from one current to another, the machine was sometimes whirled round, and once the balloon revolved upon its own axis. In his second voyage with the lady he landed her on the *Plaine de Dugny*, and ascended again by himself, with a view to find a current of wind fair for the metropolis, above that which blew near the earth in a contrary direction. It was in this attempt that he crossed the river Seine three times, and passed through three beds of clouds without finding the current which was to carry him back to Paris. He presumes he attained the excessive height before mentioned, and believes it to be the maximum of elevation consistent with the preservation of the adventurer. In the direction of north-east, he says his eyes first beheld the rising of the sun, for it was between four and five o'clock in the morning, on the 24th of July. This sight he represents as most brilliant and majestic. Though the sun's rays tempered the vast coldness of the air in his ascent, yet, when at the highest, he describes it as absolutely insupportable. This is the moment, he remarks, that the aëronaut should preserve his *sang froid*, and call up all his courage, not so much for the purpose of braving the aspect of the immense abyss below, as to surmount the indispositions he may experience, and which he calls indefinable; among other distressing sensations, a tingling in the ears, a vomiting, an accelerated impetus of the blood, with an inflation of the arteries from such increased circulation. He finished this expedition at six o'clock the same morning, on the plains of Sempigny, on the borders of the river Oise, at twenty leagues from the place where he set out, which run he had made in an hour and three quarters. He concludes his own account of the voyage, and the probable utility of the further cultivation of the science of aërostation, by signifying that a dispatch

might be carried to Holland in eight hours, in a balloon, with advice from the Directory for the sailing of the Dutch fleet out of the Texel."

"Mr. Socoloff, of Petersburgh, has repeated Dr. Franklin's experiments on recovering flies drowned in spirituous liquors. He found, that when these insects had been apparently dead for a quarter of an hour in spirit of wine, they were speedily recovered by covering them with warm ashes. Beetles and spiders were restored to life in like manner."

"A species of fluor-spar has been discovered in Nertschinck, externally very similar to the common violet coloured fluor, but differing from all others in this particular; that, when heated to a considerable degree, it assumes a beautiful emerald hue, which it loses when cold, and recovers on being again heated. It has undergone some experiments by Prince Gallitzin and M. Von Veltheim, director of the mines, and a satisfactory analysis may soon be expected from the known accuracy and abilities of Professor Klaproth."

"The celebrated Professor Spallanzani, having observed that certain species of bats appeared to be able to direct their flight in a room perfectly dark as well as in the light, has made several truly barbarous experiments on this subject. He began by pasting up the eyelids of these animals, after which, when let loose, they flew about the room in the same manner as if their eyes were open. Not content with this experiment, he had recourse to the cruel expedient of destroying their eyes entirely; and even after this operation they flew perfectly well from one apartment to another, avoiding every obstacle; and when fatigued, suspended themselves against the walls in their usual manner. These facts the learned professor has thought proper to explain, by supposing that they possess a new sense, unknown, apparently, to other animals, but which enables these to direct their motions when deprived of eye-sight.

"Mr. Jurine, of Geneva, has repeated many of these experiments with considerable accuracy. He extended several twigs of willow across a room, and let loose two bats, which, in their flight, passed and repassed between these twigs, and always returned to the same resting place on the cornice of the room. He then blinded these bats by destroying their eyes, and on again turning them into the room, their flight was as perfect as before. Afterwards, on turning loose one bat that saw, and another that was blinded, the latter followed the former in every part of its flight, passing through all the openings between the twigs with as much ac-

tivity as its leader. Mr. J. however, found afterwards, that if the ears of a blinded bat were filled with pomatum, it was no longer able to fly steadily and with exactness."

[For the above information we are chiefly indebted to the (London) Monthly Magazine for May, June, July and August last.]

MEDICAL OBITUARY.

Died, Sept. 16, 1798, I. B. Scandella, M. D. aged 28. The fate of this gentleman was, in a remarkable degree, to be lamented. He was a native of the Venetian State. His family were opulent and high in rank. He had received the best medical education, but had consecrated his faculties to the general improvement of science, and the benefit of mankind.

Having resided for some time at London in the capacity of Secretary to the Venetian Embassy, he conceived the design of visiting America. His country's service no longer demanding his attention, he proposed to gratify a liberal curiosity in surveying the principles and structure of a rising empire.

He first arrived at Quebec, and thence took various journeys through the southern and western districts. His personal merits secured him the esteem of the persons among us, most eminent for their knowledge and talents. His candour and blameless deportment made him be regarded with peculiar tenderness by all who knew him. His chief attention was directed to agricultural improvements and projects, justly conceiving that mankind would derive most benefit from the perfection of this art.

Having spent two years in this country, and accomplished the purposes which brought him hither, he embarked for Europe in June, 1798. The vessel proving unfit for the voyage, he returned to Philadelphia, the port from which he had set out. Shortly after he came to New-York, and engaged a passage in a packet which was speedily to sail from this harbour. The detention of his baggage, which was daily expected from Philadelphia, occasioned him the loss of this opportunity. An epidemical disease had meanwhile made its appearance in both cities. Notwithstanding its greater progress and malignity in the latter city, his concern in the welfare of a helpless family, whom his departure had deprived of their only useful friend, induced him to return thither. After enduring the continual loss of rest, and exposing himself to the influence of an infected atmosphere for ten days, he set out on his return to New-York. He had scarcely arrived before symptoms of disease appeared, which, on the sixth day terminated in death.

Sept. 19, 1798, ELIHU HUBBARD SMITH, physician, one of the Editors of this work, aged 27 years. He died a victim to the late destructive epidemic. There were few who perished during that calamitous season, whose fate excited more universal regret, and whose memory will be more fondly and permanently cherished. In his domestic relations, the knowledge of his excellence is necessarily confined to few; but by those few, his conduct as a son and a brother, will ever be regarded as a model of unblemished rectitude. Indefatigable in the promotion of the true interest of those allied to him, a casual observer would be disposed to imagine his whole attention to be absorbed by this object, and that he whose affections were so ardent, and his mind so active for their good, had no leisure for the offices of friendship, and for the pursuit of general happiness. To these valuable purposes, however, no one attended with more zeal and assiduity. To those who were blessed with his friendship, and the number was by no means small, his attachment was unwavering, and his efforts for their benefit without remission. To the cause of general happiness, he devoted his abilities with no less zeal.

He was a native of Lichfield in Connecticut. The rudiments of knowledge were imbibed at this place. He entered the college of New-Haven at the early age of eleven. Here he gave proofs of intellectual energies and attainments, usually deemed incompatible with so immature an age. His education was completed under the care of the Rev. Timothy Dwight, who kept a school of considerable repute at Greenfield. He was admitted into this seminary at the age of fifteen, and left it two years after.

He then returned to Lichfield and commenced the study of medicine under the direction of his father. In the year 1791 he arrived in Philadelphia, and attended the medical lectures that are annually delivered in that city. In the succeeding year, he took up his abode, as a practitioner of physic, at Wethersfield in Connecticut. Finding little employment in this place for any but his social and moral virtues, he repaired, in the autumn of 1793, to New-York, where he remained till the time of his death.

His talents could not otherwise than slowly surmount the obstacles which were thrown in the way of his professional success by his youth, and by the want of patronage and support. His leisure, however, he devoted to the best purposes. Besides his medical pursuits, he cultivated, with zeal and success, almost every branch of literature. He was early distinguished by his attachment to the muses, which is attested by a great number of juvenile compositions. These have found their way, in different forms, to the world, and manifest a vigour of imagination and style, which,

with the advantages of age and experience, would have rendered him an honour to his country.

As a physician, his loss is irreparable. He had explored, at his early age, an extent of medical learning, for which the longest lives are seldom found sufficient. His diligence and activity, his ardour and perseverance, knew no common bounds. The love of science and the impulse of philanthropy directed his whole professional career, and left little room for the calculations of emolument. He had formed vast designs of medical improvement, which embraced the whole family of mankind, were animated by the soul of benevolence, and aspired after every object of a liberal and dignified ambition. He was ripe for the highest honours of his profession; his merits were every day becoming more conspicuous, and nothing but his premature fate deprived him of that extraordinary degree of public confidence which awaited a longer continuance of his life.

In 1796 the corporation of the New-York Hospital appointed him one of the physicians of that charity. The zeal and assiduity with which he discharged the duties of his office afforded the strongest proofs of humanity, disinterestedness and public spirit.

His writings, already published, incessantly awaken regret, that the number of them is not greater. They will long do honour to his memory. They display singular diligence and acuteness of research, the talents of accurate and extensive observation, great force and precision of reasoning, and the range of a vigorous and comprehensive mind.

Though sunk into the shades of inaction and silence, his example cannot cease to offer instruction, nor fail to attract imitation. His plans for the alleviation of human misery and the advancement of human happiness, though deprived of their author and supporter, will not entirely perish. No virtuous effort is lost: no portrait of excellence is exhibited in vain.

Of this work he was one of the most zealous founders, one of the most active and ardent promoters. In the establishment of it he had fondly anticipated the diffusion of useful knowledge, the improvement of medicine, and the advancement of the interest and welfare of mankind. Long, very long, will the Medical Repository have reason to deplore the fatal stroke which terminated his labours, and extinguished the hopes of his future services.

The following Physicians also died of the late prevailing Sickness in this City.

Doctors Varick, Dingley, Jones (late from England), Hathaway, Young, Milligan, Andrews, Tredwell, Hicks and Brooks.

In Philadelphia, Doctors Sayre, Cooper and Biglow.

APPENDIX.

DOMESTIC.

ARTICLE I.

On the Nature of Septic Gases; with an Examination of the Experiments made in France and England, to destroy Contagion, *by Fumigation with Marine and Nitrous Acids; being a Comment on the Publication of* J. Carmichael Smyth, M. D. *To which are added, some Remarks on Nitrous Acid, and the Use of it in Syphilis. In a Letter from Mr.* Mitchill *to Mr.* John Maclean, *Professor of Chemistry in the College of New-Jersey, dated New-York, August* 6, 1796.

ON looking over my file of unanswered letters, I find that I have not yet made any reply to yours, from Princeton, of the 23d of June last.—Be pleased to accept my thanks for the extract of Sennebier's experiments on the absorption of vital air by charcoal, in the ordinary degree of atmospherical temperature. —If I mistake not, you have a demand on me for something respecting pestilential fluids; this, as far as I am able, I shall now satisfy.

Although the phosphoric acid, and the several phosphats of soda, lime, and ammoniac, have a considerable influence on the animal composition, yet, the *capital* difference of animal substances from vegetable, and every other, depends upon the presence and operation of one principle, which is septon (azote.) This is so remarkably the fact, that it might almost be said, the addition of septon to *vegetable bodies* would be sufficient to change them into *animal products*. And hence the *septic* (nitric) *acid* so eminently characterizes *animal* decomposition.

It seems to be an established fact, (Fourcroi, Fundamental Truths, &c. p. 187.) that in that destruction of animal substances called putrefaction, nitric (septic) acid is generated, which escapes with the other fluids formed during the same process, into the atmosphere, and proportionally diminishes the quantity of animal matter; that animal matter contributes eminently, in artificial nitre-pits, to the production of the nitric acid; and that a certain portion of water

is necessary for this putrid decomposition, as it furnishes a quantity of oxygene necessary to be combined with the azote (septon) for the composition of the septic (nitric) acid.

This septic acid, so formed, possesses caustic qualities, very readily yields to combustible bodies a portion of its oxygene, and in proportion to the quantity it parts with, becomes nitrous (septous) acid, nitrous (septic) gas, or nitrous (septous) oxyd. It is known to turn *animal substances yellow*, to *decompose ammoniac* (volatile alkali,) and to strike a reddish colour with the acid of human calculus (lithic.)

If these products are among the most common and active afforded by putrefaction, it is well worth the while to estimate what connection they have with sickly countries and seasons.—I shall take an example from Asia, because the facts are before me, which may, *mutatis mutandis*, apply to any other part of the world.

Unhealthy exhalations proceeding from the earth denuded after the subsiding of the Euphrates, are annually felt at Bussorah, a large trading town, situated about forty miles north-west of the Persian gulf, between the river and the desert. About a century ago it was almost depopulated by death and desertion. Another very severe visitation happened in 1773; and yet another alarming one in 1780. The distance between this place and Bagdat is about two hundred and fifty miles. The country along the river is remarkably flat and low, and intersected with canals after the manner of Holland. It is rich and fertile, the meadows being very luxuriant, and affording pasture for great herds of cattle. The level desert, covered for many miles with a *saline incrustation*, reaches on the Arabian side to the gates of Bussorah; and the water left by the decreasing Euphrates on this desert, and the country above and below, has always been considered as the chief cause of the pestilential distempers prevalent thereabout. Innumerable dead bodies of animals, in and about the city, contribute to render the air highly malignant and noxious: and there it was the sickness prevailed with the greatest mortality. But it is not confined to the country thereabout, for it has been known to extend from twenty miles below Bussorah, up the Euphrates to Bagdat, and thence along the Tigris to Assyria and Diarbekir, limiting itself however to a space of no great width on each side the rivers. (Transactions of a Society, &c. p. 55, and seq.) The septic vapours rising from the animal substances rotting near the surface of the earth, are properly enumerated by the inhabitants among the leading causes of those several visitations. This opinion is supported by the luxuriancy of vegetation and the fertility of much of the adjoining soil; and will be further corroborated, if, upon more diligent inquiry, it shall turn out (though this is im-

material to the argument) that the *salt* in the neighbourhood of Bussorah, or any part of it, is the *septite of pot-ash* (nitre.)

Although this septic (nitric) acid gas is so frequent and plentiful a product of putrefaction, philosophers have a long time maintained, that *alkalescency* in a particular manner characterized the putrefactive process, and that *ammoniac* was its most abundant result. As far as I can judge, this idea rests more upon belief than upon conviction; yet it has so long had the countenance of respectable authorities, and passed current for truth on the assertion of most writers who seem to have borrowed the sentiment from one another, that it must look like hardihood in me to call it in question.

Ammoniac indeed is afforded largely by animal substances; but its production from hartshorn, &c. as well as from pit-coal and soot, is always effected by a much higher degree of heat than is applied to such substances when exposed on the earth's surface to the warmest days of summer. It is produced in a range of heat high enough to destroy nitric (septic) acid, and this is far greater than the human body is ever exposed to. Heat, equal to that of fuel burning on a hearth or in an oven, destroys pestilential (septic) vapours; because, in that temperature, the oxygene of the septic compounds is attracted by the flaming fuel, and then the septon (azote) combines with hydrogene to form volatile alkali in the chimney.—I do not deny the possibility of its formation during common putrefaction; but I own I am unacquainted with sufficient proof of its being produced, under such circumstances, either very frequently, or abundantly. In maintaining, therefore, that ammoniac is so exceedingly plentiful a product of ordinary putrefaction, I cannot help thinking the modern philosophers, out of respect to great and eminent names, have been less guided by rigid experiment than governed by the *argumentum ad verecundiam*.

Or, if it should be admitted, for argument sake, that volatile alkali is so abundantly evolved as is contended, then, according to the law of chemical affinities, its causticity would be instantly destroyed by combination with carbonic acid, or it would be attracted by water, and be very easy of detection, or be neutralized or decompounded by the septic (nitric) acid; in either of which cases, it would be utterly incapacitated to float at large through the air, and be the cause or vehicle of epidemic distempers.

After all this, is it not a little surprising, that notions about the *alkaline nature of contagion* should still be uppermost in men's minds? Notwithstanding the difficulties with which the subject is entangled, they continued to believe and declare that ammoniacal gas, or something of which it is an ingredient, imparts, in times of pestilence, its venomous quality to the air. Their heads have

been so possessed by this persuasion, that fumigations with *acid vapours* have been considered, time immemorial, and especially of late, the great correctors or destroyers of contagion. To effect this, the most recent and approved practice is, to let loose the fumes of the nitrous, marine and sulphuric acids into the infected place, that they may attach themselves to the contagious atoms, and neutralize or decompose them.

Upon this principle it was that so circumspect and considerate a man as GUYTON DE MORVEAUX recommended to the physicians of France, and to the Committee of Public Health, to purify hospitals with the steams of *muriatic* acid, as being equally efficacious with the sulphuric vapours, and more volatile, diffusible and penetrating. Upon examining that gentleman's proceedings in 1773, to purify the cathedral of Dijon, which had become very highly infected, I can find nothing accomplished, which *evacuation*, *ventilation* and *careful purification* would not have done equally well, without the acid fumes. (Instructions sur les Moyens d'Entretenir la Salubrite, &c.) In this tract he recommends the acid gas as very well adapted to neutralize the putrid alkaline air (gaz ammoniacaux putrides) continually exhaling from the privies.

Nor do I find any thing more conclusive in favour of the peculiar advantage said to attend the *deflagration of nitre*, with an iron heater, as practised by J. CARMICHAEL SMYTH, in 1780, in the jail and hospital of Winchester, where the Spanish prisoners were dying off very rapidly, by reason of the hardships they underwent during their captivity. Does it not appear to you, that *ventilation and washing of the buildings*, *bathing*, *and walking out for the prisoners*, *removal of dirty beds and clothes*, *and clean supplies of both*, *exposure of the hammocks to the open sun-shine*, *better medical and chirurgical attendance*, *&c.* for all these things were observed, are sufficient to lessen contagion, independent of the vapours emitted from a little salt-petre? (SMYTH on the Jail Distemper, &c. p. 56, and seq.) If, after the well-directed means employed, both by MORVEAUX and SMYTH, to purify the buildings of Dijon and Winchester, they had, instead of fumigating with marine and nitrous acid gases, opened their snuff-boxes, and dispersed the powder of tobacco through the air of the apartments, they would have destroyed full as much contagion.

Since the Winchester experiment, which had been laying dormant for fifteen years, the lords of the British admiralty had a trial made in the latter part of the year 1795, on board the Union hospital ship, with the vapours emitted by salt-petre, when under decomposition, by means of the sulphuric acid. (SMYTH's Letter to EARL SPENCER, &c.) The relator gives a most flattering account of the success of the experiment, which was conducted in the presence of the sick, who were made to breathe, for some

time, the airs extricated from the nitre, while the ship's ports and scuttles were intentionally closed up to confine the medicated steams. These, when extricated from earthen pipkins and teacups, as Mr. KEIR has very well observed, do not consist merely of highly oxygenated (nitric) septic vapour, but of a large quantity of pure respirable air, at the rate (Chaptal, Article Nitrate of Pot-ash) of twelve thousand cubic inches of oxygene gas for every pound of the salt, which may be breathed with safety, and is very unlike the suffocating steams evolved during metallic dissolutions. The good done was derived from *the vital air* thus afforded the sick, stowed away between decks, and from Mr. BASSAN, the surgeon's care, in having *the dirty linen immediately immersed in cold water on deck*, and *rinsed out before it was carried to the wash-house*, *in paying due attention to cleanliness and ventilation*, *and in having seven noisome privies removed from the inside of the lower deck*, *and two from the inside of the middle deck*, *to the outside of the ship*. Beneficial as this trial is said to have been, I cannot refrain from thinking, that if the same things had been attended to, excepting the septic (nitric) acid gas, the advantage experienced by the sick would have been yet more considerable, saving only the rendering the nostrils less susceptible of odours. Never was any thing more radically wrong than these proceedings.*

Of a similar nature are the experiments made in December 1795, by Mr. MENZIES, in fumigating the Russian ships at Sheerness. (MENZIES' Report, &c.)

His Britannic Majesty's physician extraordinary will probably think me very incredulous, in withholding my assent from testimony, which, in his estimation, proves the power of *mineral acids*, particularly the *muriatic* and *nitrous*, to destroy contagion, " be-

* This opinion is since amply confirmed. Dr. Trotter, physician to lord Howe's fleet, has entered a formal complaint against fumigations with nitrous acid gas; affirming that " Dr. Smyth's preventative is the very substance " that every intelligent officer is hourly employed to drive from the decks " of his Majesty's ships." As to the experiment on board the Union hospital ship, he says there is a deception from first to last in the business. Messrs. Blair and Blane, the commissioners for sick and wounded seamen, to whom Trotter's protest was referred, admit the noxious quality of this gas in its concentrated state, though in a diffused and dilute form, it does appear the fumes produced *any considerable inconvenience*. They allow, however, that the mortality among the Russians, and the sick at Deal, where the usual modes of prevention were practised, was less than in the Union where the nitrous fumigation was employed. In preference to this vapour, *they* recommend smoking with fire and brimstone! Since the contagion is found to progress, notwithstanding all the care and perseverance in the fumigating process, it may not only thence be inferred that nitrous vapour is prejudicial, but that the whole of these boasted experiments corroborate most powerfully the doctrine of septon. See Trotter's Med. Nautic. p. 220—248.

"yond the cavils of scepticism itself." He cannot prove the *nitrous* to be a *mineral* acid, but he can easily satisfy himself of its *animal* origin, during the putrefactive process, of which it is one of the most common, abundant and mischievous products.* As much as I applaud Dr. SMYTH's humane exertions, and admire his zeal in this business, I still am obliged to differ from him as to the nature of contagion, and the means of fixing and decomposing it; and, as much as I doubt the possibility of destroying it by the means recommended, it pleases me to find Dr. BEDDOES rebuking Mr. DUNDAS, (Essay on the Public Merits of Mr. PITT, p. 12 and 13.) for not having directed trials to be made with those acid vapours in the British islands, fleets, and armies, where pestilence cuts down more of their soldiers and seamen than the sword of the enemy.

The wrong opinion prevalent concerning the nature of contagious exhalations has thus, you see, given rise to wrong practice, in the attempts made to destroy them. Mankind have ever acted as if the putrefaction of one body had a spreading or assimilating power, to make other things in its neighbourhood putrefy. They have not considered as fully as they ought, that, after putrefaction is past, and even during its progress, the vapours produced are, with reference to inanimate substances at least, highly *antiputrescent*. For instance, *fixed air*, so copiously extricated at such times, has just the reverse of a putrescent operation; and the same is true of septic (nitric) *acid*, and *volatile alkali*. Indeed, whatever the prevailing notion on this head may be, it is impossible that substances which have undergone putrefaction should still be putrid: as well might it be said, that bodies which have undergone combustion are yet a burning. Both the one and the other of these processes resolve the complex structure of plants and animals into new and simpler combinations of elementary particles; and to say, that the products of putrefaction possess a power to *putrefy every thing near them*, has just as much sense and propriety in it, as to affirm, that the products of inflammation must always have a *tendency to inflame* any thing they touch. The fact is, that substances which have passed the fire are *incombustible* afterwards; and matters, which have undergone putrefaction, are thenceforward *antiputrescent*. Pestilential fluids being thus the offspring of a *septic* process, thence derive their name and title; but they are *antiseptic* in their effects, and undermine health, and

* In addition to the authorities I have heretofore cited to this point, it may not be amiss to refer this gentleman to ERXLEBEN's *Anfangsgründe der Chemie*, published at Gottengen in 1775. That author expressly ranks this acid among the products of animal and vegetable putrefaction. (§ 189. § 302.)

take away life, by impeding respiration, interfering with digestion, mingling themselves with the blood, stimulating the heart excessively, &c. and not by any operation on the living body, resembling the vulgar notion of putrescency.

If these views of this subject are right, then it should follow, that substances which have undergone the putrefactive process would be preventives of putrefaction in dead animal matter. This is found to be really the case. In the seventh chapter of ALEXANDER's *Experimental Inquiry*, (p. 62, and seq.) concerning the causes that have been generally said to produce putrid diseases, it is proved, that the most *nasty* and *offensive* water from ditches, puddles and sewers, possessed a power of preserving beef and mutton from putrefaction much longer than *pure* water. This was found to be true of the water of the *North-Loch*, the ditches in the *meadows*, and the *drainings* from the *Cannongate* of Edinburgh, and of the water of *St. James's Park* and *Fleet-Ditch* in London; waters which nobody who has observed whence they were taken, will doubt of containing putrid matter enough to render them fit subjects for these experiments! Raw meats put to macerate in these liquids, and hung in their vapour, were universally found by far less liable to putrefaction than when exposed to common air and common water.

Yet this author fell into the prevailing mistake, as to the interpretation and application of his own experiments. For as the effects of putrid water and its exhalations were antiseptic upon flesh, he concluded that such antiseptic substances could not be the cause of what are called putrid intermittents, dysenteries, &c. &c.

But ALEXANDER had not learned that the term "putrid" was very unhappily chosen, and most unphilosophically applied, to designate diseases; nor that the distempers called by that name were truly caused by the external and internal operation of an exceedingly powerful antiseptic.

Is it not passing strange, that, after all this, and after CRONSTEDT's declaration that it is one of the characteristics of the nitric acid (1 Mineralogy, p. 287.) to "act very powerfully on all "animal and vegetable substances," that it should ever have been thought of as a destroyer of infection, and not a destroyer of life?

With many good wishes for your welfare, believe me to be truly yours,

SAMUEL L. MITCHILL.

Professor MACLEAN, Princeton.

P. S. Yet this has been proposed and practised with a view to overcome contagion when lurking in the living body, as well as when floating in the air. The public has been frequently addressed of late on the subject of nitric acid employed as a remedy

in relieving and curing the venereal disease, and in bettering the state of the constitution in sundry other complaints. It is cried up as a much more efficacious remedy than quick-silver, and as likely to supplant prescriptions of which that metal constitutes a part, entirely. The declarations in favour of opium as a sovereign remedy for syphilis, were not more positive in New-York, towards the close of the revolutionary war, among some of the physicians and surgeons of the British garrison, than the assertions appear to be at this time among some of their medical managers of hospitals in the East-Indies and in England, in favour of the nitric acid. But opium, like sarsaparilla, guaicum, lobelia, and mercury, often disappointed the expectations of its prescribers, and has long since declined in its reputation as a specific. What good the thing they call nitric acid is capable of doing, and how long it will continue to work wonderful cures, time and experience must determine. They who recommend it most warmly, already candidly allow, that in a number of instances, it has unaccountably failed.

In all cases whatever, it is highly necessary to have a precise notion of every thing to which we give a name. Unless this is duly attended to, uncertainty and error will insinuate themselves into all our reasoning. We shall be diverted from the plain path of fact, and be constantly deluded by the phantom of words. I have had occasion, in former discussions, to shew how deeply mankind had been deceived by adopting improper terms on the subjects of *putrefaction*, *inflammation*, and *fever*. I find it necessary, at this time, to point out some mistakes arising from the confounding several distinct things under the names of *nitrous* or *nitric* acid.

In every instance where I have spoken of the nitrous or nitric acid, or what in the reformed Nomenclature is denominated septous and septic acid, I meant a mere chemical union of septon (azote) with oxygene, diluted with more or less of water, and existing in a liquid or aëriform state, as happens in and about corrupting masses of organized substances wherein the acid of putrefaction is formed. The effluvium from this particular product, is what I have considered to be the very matter of pestilential air. But because this fluid and the gas into which it may be evaporated, sometimes meet with pot-ash and form the salt called nitre, the acid has been most illogically designated by appellations derived from that compound salt. What I understand by the septic acid is a production which has never been united with pot-ash at all, nor been changed from its original constitution by admixture with other acids or substances during the process of separation from that alkaline basis. The acid separated by art from the fixed vegetable alkali, has been incautiously supposed to be the same which is fabricated in the laboratory of nature. By considering with minuteness the operation for obtaining the nitrous and nitric

acids, and the single, double, and compound aqua fortis of the shops and of commerce, it will instantly appear that pure septic (nitric) acid is very rarely procured, and that from the very nature of the process, it must be adulterated with some foreign ingredient.

What tricks may be played by trading chemists in the preparation of this acid, I pretend not to know. From parcels of it bought by myself for experiments, I can declare it to be frequently vitiated in so considerable a degree, as to be totally unfit for almost the commonest use. It certainly acquires no purity by passing through the hands of apothecaries and druggists. The frauds and impositions constantly practised by the dealers in drugs and medicines, who in America are under no controul from inspection by public authority, are dismal and shocking; and the persons who swallow the compositions made of such vile materials, must abide by the consequences.

But supposing the manufacturer to be scrupulously exact in preparing the nitrous acid according to the most approved receipts, and the wholesale trader and retail dealer to keep it with the utmost care afterwards, even the acid obtained by most of the processes is and must be very different from the original and genuine acid of putrefaction:

For example; the College of Physicians of Edinburgh direct the nitrous acid to be prepared by pouring a pound of sulphuric acid upon two pounds of purified salt-petre in a glass-retort, and distilling in a sand-heat, gradually increased until the iron-sand pot becomes obscurely red-hot. The London College order the process to be conducted in nearly the same way, without deviating in any material circumstance. And these seem to be but repetitions of the method pursued long ago by GLAUBER in Holland, and followed by the Dutch artists to the present time. In performing these operations, there is generally a surplusage of sulphuric acid, which being not neutralized by the pot-ash, rises in vapour, and passes over into the receiver with the nitrous. Thus the nitrous acid of Scotch, English and Dutch preparation is, in reality, not the pure material, but a true (nitro-vitriolic) suphureo-septic acid.

What is true of the *nitrous acid* is more strongly applicable to *aqua fortis*, in the making of which, as colcothar and sulphate of iron (copperas) are employed, there is a necessity for a more violent heat than in the before-mentioned processes; whereby the acid produced is exceedingly impure, and indeed acknowledged to be unfit for pharmaceutical purposes. So much does the sulphur predominate, that like the former, only in a more considerable degree, this is a sulphureo-septic acid, wherein oxygene is united to a double basis of sulphur and septon (azote). And such is the disposition of the two acids to combine during the operation, that how carefully soever the nitre is purified, and how skilfully

soever the distillation is performed, the nitric acid procured will always be charged with more or less of the sulphuric; and vice versâ, when nitre is employed in manufactories of sulphuric acid to assist the combustion of the brimstone, the sulphuric acid is always mingled with a portion of the nitrous. Upon such mixtures of acids are our experiments generally made! Such is the composition of the greater part of the sulphuric and nitric acids prescribed for the sick! And upon such a frail and sandy foundation, have men undertaken to reason and philosophize! The fallacy of deductions from such premises, if intended to refer to pure sulphuric or pure nitrous acid, is obvious enough to strike the attention of any boy who can read his dispensatory.

How many of the experiments published have been made with *pure* nitric acid does not appear. But as the acid, from the accounts of the experimenters themselves, appears to be prepared by the common processes, there can be no doubt, that the unmixed and unadulterated nitric acid has never yet been prescribed. In the forms in which the substance called by that name has been administered, its peculiar activity and poignancy have been blunted by its combination with brimstone or something else.

All chemical union implies a change of qualities in the substances combined. The combination of the unknown basis of the muriatic acid with the nitrous, in compound aqua fortis and in aqua regia, imparts to those preparations a variety of new properties. Alkohol does the like in the dulcified spirit of nitre. And shall the union of sulphur with septous (nitrous) acid not work a sensible change in its affinities and attractions?

The reader of the cases reported by Messrs. Scott, Baynton, and Hammick, is therefore to consider that *the pure and genuine septic acid*, as afforded by nature in putrefactive processes, has never been prescribed by them to their patients. Whatever of good or harm has been done by them when they administered their acids, in venereal cases, is the effect of the nitrous acid combined with more or less of the sulphuric or muriatic acid, or perhaps with both. The nitro-muriatic, the nitro-sulphuric, and the nitro-sulphureo-muriatic acids, are the weapons they have armed themselves with, to conquer the formidable power of syphilis.

The septic acid is more prone than any to act upon other substances. Its attractions are more various and diversified. They embrace a far wider circle of objects.* So general are its affinities, that in the course of ordinary occurrence there is scarcely any thing except silicious earth, upon which it does not operate. Some of the things it meets with, as lime, clay, and alkalies, &c.

* Kirwan (2 Elements of Mineralogy, p. 3.) believes it never has been found in a *free state*, except in charnels perhaps, and privies.

neutralize it entirely; others, as sulphur, alkohol, &c. neutralize it partially; others again, as fire, vegetation, &c. destroy it completely. From this remarkable disposition of almost every thing on earth to modify the acid of putrefaction, it never can retain, for a long time, its native and primitive character. Its characteristic virulence exists only near the place of its production, and that commonly but for a short time. Almost every thing it touches in its progress through air, earth, and water, affects its constitution very materially, by adding something to it, or depriving it of something. From the vast number and strength of its attractions, it is almost impossible to procure it artificially, in the precise forms in which putrefaction and lightning engender it. And happy for the animated part of the creation it is, that its pestilent vapours may be checked, blunted, and counteracted in so many ways. In surveying the politics of nature, I observe scarcely any instance where the means seem adapted to the end with more consummate skill and masterly contrivance than in this.

One may thus comprehend how the nitric acid of trade and of the shops, which in truth is a nitro-sulphuric acid, may be taken into the mouth and stomach, not only without detriment, but oftentimes with benefit. The poison it contains, like the poison of the viper, small-pox, arsenic, and other poisons, is quelled by the gastric juice, provided the quantity swallowed be not too large, and by the other contents and the concoctive powers of the stomach. Yet even here, notwithstanding such clogs and restraints, the ferocity of its nature now and then breaks out, and soreness of the mouth and gums, sickness of the stomach, griping pains of the belly, and mucous and bloody stools, are some of the feebler effects of its virulence. Nor is there more difficulty in understanding, wherefore the nitro-sulphureous vapours of aqua fortis to which engravers in copper are exposed, do not affect their constitutions, with the malignity peculiar to the almost unmixed septic acid effluvium issuing from the abdomen of putrifying corpses, and occupying the long-closed vaults wherein they have laid.

With such interpretation as this ought every person to be instructed who reasons about the effects of that nitrous acid in medicine, engraving, silversmith's work, dying, and the other arts.

According to the kinds and numbers of things blended with septous acid, and the laxity or intenseness of their coherence, will its effects upon living bodies and substances of all sorts be modified. Scarcely can any two parcels or samples of it be expected to have exactly the same composition, or to produce precisely similar effects. Every gradation of mixture produces a correspondent degree of variation in its operation; and every one of these, endless almost as they are, alters the original virulence of the naked acid.

Is it easy to foretel what will happen to the prescribers of nitric acid in syphilis. There will be different results from their experiments. They will dispute and contradict one another. In the mean time, the fallacy of the whole matter will become apparent, and the nitric acid, like a number of other celebrated specifics, gradually lose its ill-gotten reputation, and sink into neglect. Its advocates may extol it as much as they please, and force it into notice, but they cannot thereby alter the rules of chemical action, nor change the laws of nature.

But the discussion will be eminently serviceable to science. Our understanding is such as to derive profit from the observation of error, as well as the exhibition of truth. I hope, therefore, the trials with this remedy will be continued until every body is quite satisfied. It will thereby be determined *what is the true doctrine*, and this will eventually be established on the ruins of all badly-constructed systems.

December 14, 1797.

ARTICLE II.

On SEPTON *(Azote) and its Compounds, as they operate on Plants as Food, and on Animals as Poison: intended as a Supplement to Mr.* KIRWAN'*s Pamphlet on Manures. In a Letter to the Rev. Dr.* HENRY MUHLENBERG, *of Lancaster, Pennsylvania; from Mr.* MITCHILL, *of New-York, dated October* 24, 1796.

THE letter which you wrote me from Lancaster, on the sixth of June, would not have remained unanswered so long, had I not been engaged in making a tour through the state of New-York, by an appointment of our Agricultural Society, which I was prevailed upon to accept. You observe, that gypsum has been found in Pennsylvania, near Lake Erie, in large quantity; and I have the satisfaction to inform you, I have received beautiful specimens of transparent lamellated gypsum, said to be found plentifully in Onondaga county, in the state of New-York. The powder of gypsum does wonders in the interior part of our country; for I know not whether I should be extravagant if I told you, that the proper use of it *doubled* the *productions* of the land.

But I am not disposed, at this time, to discuss the subject of gypsum with you. There is another manure, which, though exceedingly abundant and active, has been strangely overlooked by most persons. On account of its connection with the life and health of plants, and the diseases and death of animals, it merits an eminent share of attention. Some observations and reflections on this sub-

ject, which occurred to me during my late expedition, shall form the remaining part of this reply to your last.

In my letter to Chancellor LIVINGSTON, of February 20, 1796, an attempt was made to show that plants had the power of destroying pestilential fluids, and of rendering the atmosphere, which had been contaminated by them, healthy. It was stated, that the septon (azote) was taken up as a nutrient material, and retained in the vegetable economy, while the oxygene was discharged, and, in company with caloric and light, renewed the respirable portion of the atmosphere.

I shall now prosecute the inquiry a little further, and go into some practical details relative to this sort of manure. This task I the more readily undertake, as I find the experienced and accurate Mr. KIRWAN, a copy of whose valuable publication has been just sent us from the British Board of Agriculture, has made no mention whatever of the septous principle (azote) as a manure. (The Manures most applicable to the various Sorts of Soils, &c. London. 1796.) This letter, then, may be considered as a supplement to Mr. KIRWAN's pamphlet.

What I have to remark will be comprised under three heads. 1. That animal manures contain septon (azote). 2. That plants, nourished by such manures, contain it also: and, 3dly. That hence may be derived a principle elucidating the use and operation of such manures.

1. The whole history of decaying animal substances tends to prove the abundance of septic (azotic, nitric) ingredients they afford. The urine and excrements of neat-cattle and sheep, the soakings of dunghills, the earth of horse-stables and cow-houses, the soil of graves, and, generally speaking, animal relics, and putrefying carcases of all kinds, afford, every one of them, septic (nitric) acid. This acid is composed of septon (azote) and oxygene. Water aids the formation of this acid, by promoting intestine motion among the decaying materials, and by its own decomposition furnishing any quantity of the principle of acidity which may be wanted. And, when formed, water acts as a vehicle to convey and apply it to the various substances it meets with.

Accordingly, this product of animal decomposition being yielded plentifully by the materials collected in yards and along streets, filters through the earth in cities, and taints the waters of their wells; most of which, especially in large and long settled spots, are found, by experiment, to contain it, either separate or combined with fixed vegetable alkali, in the form of a *septite of pot-ash* (nitre). It must be hence apparent, that the water of such wells ought not to be employed for the domestic uses of washing, cooking, or drinking; but that, in well-regulated societies, aqueducts should be constructed, for bringing water to towns, from springs

or sources considerably distant. This branch of public economy, which was so diligently attended to by the ancient Romans, is considered, by American municipalities, as of small importance. They had rather offer a yearly sacrifice of hundreds of citizens to the demon of pestilence, than make the most easy and obvious of all public provisions for washing away such pollution. I have often thought the sixth labour of a great DEITY of ANTIQUITY very applicable to the considerable towns in the United States, which may be considered as so many AUGEAN stables, requiring the waters of a river to be poured through, in order to cleanse them.

In like manner *stagnant lakes* are vitiated (BERGMAN. *Analys. Aquar.* § 4.) by animal and vegetable products; while *ponds*, *marshes* and *puddles* are still more highly impregnated with similar extractive and septic matter. The fertilizing effect of such waters on plants, as far as the *septic principle* is concerned, may be easily observed in meadows moistened by these fluids, where grasses and other plants possess great luxuriance. The unhealthy operation of such exhalations on animals is observable, when, after the evaporation of these waters, too great a proportion of septic vapour rises for the neighbouring plants to decompose. Our unditched morasses, and undrained swamps, reeking occasionally with pestilential steams, would remind me, if I had a disposition to indulge classical allusion, of the need there is of another HERCULES to overcome another ACHELÖUS.

The connection there is between malignant distempers and dirtiness has been already remarked by TISSOT, (Avis au Peuple, &c. ch. ii. § 7 and 8.) among the peasantry of Europe. Septic substances, the offal of slaughtered animals, the refuse of house-keeping, &c. when mingled in due quantity with the soil, justly ranked among the best fertilizers. The impregnation of land, around houses and barns long occupied with such materials, is the acknowledged cause of its superior productiveness. While these manures are mixed with earth in such quantity as to promote and not overpower vegetable life, their noxious effluvia are repressed, or their virulence counteracted, by the mediation of plants. The instrumentality of these classes of animated beings seems to be intended to keep the great balance of nature in equipoise, and prevent either scale being overloaded with materials destructive of animal life. But it, nevertheless, sometimes happens, that in cellars, and around country dwellings, in pig-styes and cow-pens near the house, there are accumulated great quantities of excrementitious and corrupting substances, which, if seasonably carted away, tend eminently to fertilize the fields, and promote the growth of vegetables; while, at the same time, by remaining, they render the house foul and unhealthy, by the extrication of *septic* VA-

FOURS. Neatness and elegance are thus found to be as conducive to good health as to good husbandry. On considering the matter, it appears evident, that the effluvia from the neighbourhood of dirty cottages and mean huts, in the country, are of a like nature with the pestilential fumes which insinuate themselves into foul and unventilated tenements in cities; and the reason is apparent, wherefore, as penury is generally associated with ignorance and nastiness, and often with indolence, these distempers rage with such tremendous violence among the poor.

When I see a farmer permit such unwholesome substances to collect around his habitation I cannot help reflecting on the danger which awaits him. The manure, which ought to have been carried away and spread over his lots, serves, as it lays, but to make his family sickly, to disable his labourers, and lead him to the dubious and expensive routine of physic; and, as in common life as well as in logic, one blunder leads to another, the want of crops, and the consequent failure of income, drive him to mortgages, judgments, and executions, those fatal expedients of law.

In like manner do I lament the indiscretion of tenants contending in our cities, which of them shall obtain, at a high rent, from the distant landlord, *a pestilential stand for business!* With the view of bettering themselves, they venture, at all hazards, amidst the poisonous exhalations of the neighbourhood. By and by they are visited by distempers; and as they are honest and sober citizens, having no uneasy conscience to reproach them for their sins, they piously consider this affliction as a monition from Heaven to try their virtue. Their sense of constancy and firmness forbids them to fly from the scourge of the Lord, and thus they religiously stick to the infected spot! What is the true interpretation of such conduct, but that both the farmer and the trader, obstinately persisting in the means of self-destruction, are guilty of a sort of suicide?

It is a fact, long ago established, that great cities are the graves of the human species. It is a truth of almost equal importance, that the foul habitations of country people are nurseries of pestilential distempers. The street-manure of cities consists of pretty much the same materials with the yard-manure collected about farm-houses. Both are unhealthy for a similar reason. The costly excrtions of the cit, to amass septic materials of all kinds, and from all quarters, to found his building upon, amounts to the same thing with the supineness of the rustic sluggard, who neglects to remove them from his door.

If further proof was wanting of the real nature of these manures, it would be easy to state, that, besides the affinity of septic compounds with water, they have a strong attraction for other bodies. With pot-ash and soda, of which large quantities are daily poured into the streets with the soap-suds employed in washing, and from

other sources, the septic acid forms the septites of pot-ash (common salt-petre) and of soda (cubic nitre.) With lime, which, from measuring, carting and building, is sprinkled plentifully along the streets, as well as in the mortar of walls and the cielings of rooms, it forms the septite of lime (calcarious nitre.) And with clay it forms the septite of agril (nitrite of alumine.) By these several ways are pestilential vapours kept down and prevented from exercising their deadly effects upon animals, except in cases where they are produced in quantity too great for the enumerated substances, and others with which they have a proneness to combine, to attach and neutralize.

2. There will be no great difficulty in showing, that septon (azote) is one of the component materials of certain vegetables. If it can be made evident what plants especially abound with it, we shall be furnished with a clew, leading us to the true use of the manures containing it. From an analysis of plants we have become acquainted with several of their component parts, and thence are enabled to form some judgment concerning the qualities of the manure best adapted to such and such particular kinds. There is good reason to believe, that particular manures ought to contain ingredients of the same nature and quality with those which the plants so manured are found, by analysis, to consist of. By proceeding in this manner, there can be rarely a mistake made in the application of manure. It is observable in the order of creation, that certain vegetable bodies approach more near than others towards animal nature. The presence of septon (azote) is the circumstance in the composition of organized beings, which particularly denotes animality, or the approximation to it. Septic manures being of animal derivation, ought, therefore, if they entered into the constitution of plants, to make such as are nourished by them take on somewhat of an animal nature. Let us now examine how this principle accords with facts. A familiar example may be taken from *wheat*. Wheat is most benefited by manures that contain septon. *Street manure*, *door dirt*, and *well-mixed barn yard compost*, all of which abound with septon, are among the best manures for that vegetable. And the efficacy of wood-ashes in making ground capable of producing great crops of that grain, is probably owing, if modern conjecture is true, to the septon (azote) composing a part of the alkali it contains. Some of the *swamp manures* will also produce good harvests of wheat; but others of them, though they cause a sufficient growth of straw, fail to fill the seed in the ear. The straw is large and heavy enough, but the grain is scanty and light. The reason appears to be this: Where the swamp manures happen to be charged with the septic matters, derived from animals, or from vegetable substances that approach toward animal nature, they will produce

plentiful crops of wheat; but when they consist merely of decayed plants, they are incapable of elaborating the grain in the head. The cause of this can easily be investigated by attending to the analysis of wheat. Mr. PARMENTIER (Le Parfait Boulanger, &c. page 26.) assures us of the presence of septon in the *mucous* part of meal; and he affirms, that the *glutinous* portion affords products quite similar to animal substances. (Ibid. p. 24.) If, then, the land upon which wheat grows contains a scanty quantity of septon, the seed will be poor and light in proportion to the deficiency of that article of food in the soil. Yet, in this very ground, the roots of turnips and radishes may thrive exceedingly; and so may other plants that do not employ septon as an article of their diet.

Similar reasoning applies to Indian corn or the grains of the *zea mayz*. The conclusion does not, however, rest upon theoretical probability. MARABELLI, in 1793, published an analysis of this substance, (Commentar. de Rebus, &c. tom. xxxvi. p. 461.) which proves it to afford *septous acid*. His words are, "residuum, post expressionem succi coctione extractum, præbet "*acidum nitrosum*, &c. &c." The basis of this acid, septon, was doubtless derived from the soil where the maize grew. A luminous fact! which will be found to be true of *all the cerealia*.

The same views of the subject inform us why *funguses* grow up on dunghills and in pasture grounds, where the excrementitious discharges of animals are dropped. That they are nourished by septon appears from their analysis, which proves them to contain it.

Although these considerations might appear conclusive as to this point, the evidence does not rest here. Facts of a very striking nature present themselves relative to the growth of plants on nitrous (septic) soils. In general, vegetables growing in such soils are remarked to become very large, and to get ripe early. And as they are soon ripe, they are soon rotten. *Tobacco*, in such situations, is very luxuriant, and quickly matures, but is very apt to rot on its passage from America to Europe; and too much septon in it seems to give it the bad quality of going out very readily after it is set on fire for smoking. *Potatoes* grow rapidly and large, but will keep only for a short time. *Sugar-canes* grow very rank, and are soon fit for cropping, but must be manufactured speedily, or they spoil; and even with the earliest care and best attention, afford, under such circumstances, sugar and molasses of a quality below middling. (Stubbs. 3. Lowthrop's Abridgment, p. 554.) *Cabbages*, for the same cause, ripen too soon, corrupt in the head, and last not long enough for winter use.

What PLINY relates on the cultivation of the Helvenac vine, (Nat. His. L. xiv. de gener. Vitium.) confirms the same prin-

ciple. "There is no vine," says he, "which is less accommo-"dated to the soil of Italy; the grape which it bears is clear, small, "and very apt *to rot*; and the wine it affords will not last longer "than a year; but there is no plant that thrives better in poor "land."

If these ideas are just, then the decay of such vegetable substances ought to be attended, under certain circumstances, with the production of septic or pestilential fluids. This too is the fact. *Cabbages*, putrefying in a cellar, have been known to render a house unhealthy. Corrupted *coffee* has been charged with emitting pestilential effluvia enough to desolate a neighbourhood. The like may happen from rotten *flax*, *hemp*, *potatoes*, *onions*, and, in short, all other plants which have derived septon, or the principle of putridity, from the soil in which they grew. It is probable, that rotten *wheat* contributed, with other causes, to render the vicinity of a certain store in New-York, during the pestilence of 1795, peculiarly unwholesome. The dispute, whether pestilential effluvia proceed from animal or vegetable putrefaction, seems thus reduced to its proper principle. When vegetables, containing septon, go into putrefactive decay, mischievous gases may exhale from them, having the qualities of animal productions. When this is not the case, collections of putrescent vegetable matter, as in peat-mosses and bogs of turf, emit no particularly offensive miasma to vitiate the surrounding air; but, on the contrary, the water draining from such places is often potable and good.

3dly. There now occurs an obvious explanation of one of the operations of lime as a manure, when mingled with dung and soil. The common opinion has been, that it promoted the putrefactive process of animal and vegetable matters, and thus made them more fit for absorption and nutrition. This may be the case: but there is yet another effect which has not been generally attended to. Calcarious earth combines with the septic acid into a septite of lime (calcarious nitre) and thus becomes a very valuable manure; and, at the same time, by its attractive power, it prevents the evaporation of that fluid in the form of pestilential steam. I believe, likewise, it has a further use in retaining the septic substances longer on the land, and thereby lengthening out their fertilizing effect. Old walls and rubbish, abounding with the septite of lime, frequently answer valuable purposes, as manures. Lime, in its simple state, destroys vegetation. Before it is fit to promote the growth of plants, it must be combined with some neutralizer. Its combination with carbonic acid (fixed air) is the most frequent; but in dunghills, and heaps of manure, a more common compound is formed with the septic (nitric) acid. By this connection, both the lime and the acid are deprived of their causti-

city, and preserved upon the land a sufficient duration of time, to undergo that gradual decomposition, by the vegetable economy and other causes, which favours the production and growth of plants.

How far the other septites may be operative as manures is not wholly ascertained. Doubtless they possess no inconsiderable activity. It seems to be agreed among the learned, that the word translated 'nitre' in the bible (PROV. xxv. 20. JEREM. ii. 22.) does not mean the salt-petre of the moderns, but the mineral alkali (soda.) Yet some ambiguity besets the text of *Virgil* (1. Georgic. v. 194.) as to the precise thing he meant by the "nitro" sometimes employed with the lees of oil as a steep to prepare seed for sowing.—The following facts will render it probable that septic or pestilential fluids are sometimes very abundant in the atmosphere, and disposed to combine readily with such substances as have an attraction for them; and that consequently in the cases just referred to the *nitre* might have been a *septite*.

"Nitre," says *Querlon*, (Not. ad Plin. Nat. Hist. l. xxi. chap. 10.) "is a salt belonging to all the parts of the terrestrial globe, "inhabited by men, by animals, or even by *insects;* for I have "often extracted very pure salt-petre from the little holes in walls "which served as lurking-places for *spiders*.—Animal exhalation "seems to be the means employed by nature to produce nitre, "which, on that account, is never produced either far below or "above the surface of the earth; and usually has for its matrix "rotten plaster, similar calcarious matters," &c.

In many parts of the state of New-York, much of the fixed vegetable alkali is extracted from wood-ashes. The interior country, as well as the capital, is occasionally severely afflicted with pestilential distempers, as was the case in the summer and autumn of the current year. At some of the pot-ash works, such was the amount of the septic fluids in the surrounding air during this season, that the alkali concreting on the outsides of the leech-tubs, from the leakage through the staves, attracted enough of them to convert it to salt-petre. Such a fact is of the utmost weight and importance, and of itself establishes the basis of most interesting deductions.

From the copiousness of septic products, it is apparent they incommode animal life wherever they are sufficiently concentrated. They become incorporated with metallic, earthy, and saline bodies, wherever they can find them.* They also extend their influence to unknown limits over the vegetable creation.

* This goes so far, as CHAPTAL has shewn in his *Memoire sur la Decomposition à Froid des sels Vitrioliques par l'Acide Nitreux*, (1 Mem. de Chimie, p. 47.) that nitrous acid will, even in the cold, displace the sulphuric acid, and decompound vitriolated tartar, Glauber's salt, copperas and white-vitriol.

On this latter subject it is worth the while to cite the respectable opinion of Signior SEGUIER, extracted from his letter of the 11th of August, 1754: "Io ho osservato pui di una volta un "pero, ch' e nel mio orticello, il quale avendo le foglie verdi, e "senza macchie, sono poi diventate tutte macchiate di gialla in "una notte, ed ò questo sempre attribuito a gocce di rugiada "TROPPO NITROSE, che vi sono cadute sopra:" "I have more "than once observed a pear-tree, in my garden, whose leaves "being green and spotless, have become all spotted with yel-"low in one night, which I have always ascribed to drops of "dew, of a TOO NITROUS QUALITY, which had fallen upon "them." And Count GINANNI refers to the popular opinion of the VOLATILE or SUBTIL NITRE OF THE AIR, sometimes being so corrosive, penetrating, saline and acrimonious, as to impart to the dew a power of causing disorders, and particularly *rust*, in wheat. (Viene accusato principalmente il *Nitro Volatile o Sottila* del Aria, &c. onde *la Rugiada* viziazi, &c. Delle Mallatie del Grano in Erba, par. iii. cap. 1. p. 292.) I have only to add, that my own observations tend to the same conclusion.

The atmosphere thus becomes impregnated with nitrous (septous) acid particles. How? The Abbé FONTANA has told his readers, as long ago as 1776, when his physical researches were published in Paris—Hear him: "Il paroit apres tout qu'on ne "peut plus douter que l'air commun; quoiqu'il se trouve toujours "uni avec le phlogistique de l'atmosphere, ne soit compose dans "l'origine par l'acide nitreux deponillé de sa quantite naturelle "de phlogistique; et consequemment it paroit encore naturelle "que l'air commun puisse, *dans plusieurs circonstances*, SE DENA-"TURER OU SE COMBINER DUNE TELLE MANIERE QUIL "PUISSE CONSTITUER DE NOUVEAU, L'ACIDE NITREUX, "DONT IL A ETE FORME; DE SORTE QUE L'ACIDE NITREUX "POURROIT ETRE COMPOSE DE L'AIR COMMUN MODIFIE "DANS L'ATMOSPHERE." (Recherches, &c. p. 162.) Nitrous acid, he observes, may be composed of common air, modified in the atmosphere. So it may be composed of the bases of these airs, septon and oxygene, running into union on the putrefactive decay of organized substances. I might quote more opinions.

Here, however, I must conclude, with soliciting your assistance to ascertain some points which appear to me of no inconsiderable importance, both when considered as speculations in science, and as viewed in connection with the practical arts of agriculture and medicine. What are the effects wrought upon plants by the septites of pot-ash (common nitre), clay (alumen nitrosum), and soda (cubic nitre), considered as manures?

As I offer to join heart and hand with you in pursuing these

inquiries, and have made some arrangements on my farm for the purpose, it is almost superfluous in me to observe, that I remain, with unabated esteem,

Yours, &c.

SAMUEL L. MITCHILL.

ARTICLE III.

The following Account of Dissections of Bodies dead of the late Malignant Epidemic at Boston, is so interesting, that we think proper to republish it.

Boston, September 8, 1798.

THE great advantage to be derived to mankind from an inspection of the bodies of such as have died of so formidable an epidemic as the yellow fever, must be obvious to all. The following cases of dissection may throw some light on the nature of the disease as it prevails in this town, and may, we hope, be of some use, in investigating the treatment best adapted to the purpose of checking or suppressing its destructive ravages.

The first case was of a man, who died on the sixth day from the seizure, and as no application was made to a physician till the first stage of the disease had nearly expired, the state of the organs may be considered in a great measure as the natural effect of the disease, undisturbed by art.

In the cavity of the chest, the lungs were remarkably affected—they contained an uncommon quantity of dark blood in their vessels, which rendered them apparently more dense than usual; the vesicles not being distended with air, and their substance consequently less compressible than usual. The posterior part of both lobes was extremely livid, and in the cavities of the thorax was contained a large portion of extravasated blood, firmly coagulated, to the quantity of eight or ten ounces, as nearly as could be estimated.

The pericardium contained as much as two or three ounces of fluid blood. The heart was of its usual size; but the coronary veins were so distended with blood, as to exhibit the appearance of a most successful injection. In the cavity of the abdomen, the part most conspicuously morbid was the liver. This organ appeared to be much inflamed both on its convex and concave sur-

face; its substance was much indurated, and, on cutting, resembled in colour, a boiled liver. The gall-bladder was contracted to a very small size, and contained not more than a quarter of an ounce of a thick, glutinous, and almost inspissated substance, resembling pitch. There were no marks of any considerable quantity of the bile having been lately contained in the sack, and none of the neighbouring parts had the least tinge that denoted its presence. On cutting through the ductus communis choledochus, no bile issued from the aperture; the hepatic duct had also evidently for some time ceased to transmit its fluid from the liver. The stomach exhibited an enormous distension of its veins, especially round the pylorus, and had every mark of great inflammation. The intestines, in general, were in the same state with the stomach; the smaller were considerably distended, and the larger contracted. The spleen was uncommonly turgid, but in other respects in its natural state. The peritonæum on the under side of the diaphragm, and the pleura on the upper, bore the vestiges of inflammation, but no other parts of those membranes appeared to have been diseased.

The omentum was considerably thickened, and from the turgescence of its blood-vessels, of a colour unusually dark. There were no appearances in the thoracic or abdominal viscera, of suppuration, nor was any degree of fetor perceived to arise from them; nor was there the least mark of incipient putrefaction in any part of the body. It may be proper to remark on this case, that in every stage of the disease, the discharges from the bowels were of the colour and consistence of water gruel, excepting a few evacuations of a matter similar to what is called the black vomit; and that this usually fatal symptom had also preceded the patient's death on the fourth day of the disease.

The second case. The subject of this dissection was the body of a person who died on the 12th day from the attack, with symptoms of the mixed kind; a remission of the disease had taken place, at the period usually critical, upon which, on the sixth day, a delirium ensued, and continued to the moment of fatal termination.

On opening the cranium, the brain was found to have its vessels astonishingly distended with blood, an ounce or two of serum was effused between the dura and pia mater. Under the sagittal suture, and by the sides of the longitudinal sinus, where the large veins terminate in that cavity, a lymphatic band, about an inch wide, extending nearly the whole length of the sinus, was formed by the coagulable lymph, which had been effused from the blood-vessels, by the violence of the preceding inflammation, and this substance had served as a medium of adhesion, between the dura and pia mater in that part.

The lungs adhered very firmly to the pleura on the right side, and appeared posteriorly to have been much inflamed, and in some parts to be indurated in portions of about the size of a pigeon's egg. The left lobe adhered so firmly to the pleura, as not to be separated but by tearing the substance of the lungs which here appeared extremely diseased, and in a state of actual suppuration throughout its whole substance. The heart was in its natural state. The liver was much enlarged, and in a state that denoted a high degree of inflammation; the convex surface of the great lobe near the gall-bladder exhibiting marks of extravasation, as if violently contused. The gall-bladder was full of bile, and the ducts pervious.

The stomach was nearly in its natural state; but, on the inside, the surface of the villous coat was besmeared with a matter which seemed to be of the same nature with the black vomit; though nothing of this kind had been ejected in the course of the disease.

The duodenum was much inflamed for several inches from its commencement at the stomach, and the whole tract of the smaller intestines was in the same state. The urinary bladder was contracted to the size of a pullet's egg, and its inner coat appeared to have been in a high state of inflammation, the vessels having been distended to such a degree as to have suffered a rupture, and to have effused a quantity of blood into the cavity of this organ.

The state of the lungs in this subject was probably the consequence chiefly of a previous disease, independent of that which proved fatal. An affection of the lungs had some time existed, whilst the subject was, in other respects, in tolerable health, and in the pursuit of his business; so that a pulmonary consumption would, in all probability, have shortly put a period to his life had the disease of which he died never overtaken him.

The third case. In this instance the disease terminated fatally on the fourth day.

Upon opening the thorax, the lungs discovered marks of inflammation, anteriorly, and were extremely gorged with blood, in the posterior part of their respective lobes.

The liver exhibited marks of inflammation, especially on its concave side and posterior part; its texture was altered, and of a very dense consistence. The gall-bladder was completely obliterated, its coats having coalesced with the contiguous parts, so as to form with them one confused membranous substance.—The stomach was externally, to appearance, in a natural state, but its inner coat was covered with that black coloured fluid, denominated the black vomit.

The colon in some parts had been much inflamed, as well as part of the omentum, which was attached to this intestine.

It is worthy of remark, that in both the cases where the gall bladder had been diseased, and ceased to perform its functions, or if the liver had been rendered incapable of secreting the bile, the body became yellow before death: whereas, in the other, where the bile was found in due quantity, this circumstance did not occur.

From the above dissections, which evinced a deficiency of secretion in the biliary organs, the indications of cure seemed to be directed towards a course, which might obviate the inflammation in general of the organs diseased, and open the excretory ducts of the liver, that the fluid might resume its course into the intestines.

It is with the highest degree of pleasure that we communicate to the public our hopes, that after proper evacuations, the use of calomel may be found to answer these important purposes. This medicine has been accordingly used with much success in fifteen patients within eighteen days, all of whom, excepting one, have recovered, or have past the dangerous period. It has been given not in the usual doses, for the purpose of an evacuant by the intestines, but in small doses, of one, two, or three grains, every hour or two, so as to produce a salivation as soon as possible; with this view, from one hundred to two hundred and thirty grains of calomel have been given in the course of three or four days, commencing the use of it immediately after the first copious evacuations by bleeding and purging; and, in every instance, as the salivation came on, the disease abated.

Coinciding in sentiment respecting the use of mercury, so as to produce a salivation, we with pleasure mention the learned Dr. Rush of Philadelphia. But the method is more explicitly and highly recommended by James Clark, M. D. F. R. S. E. in a treatise on the Yellow Fever, as it appeared in the island of Dominica, in the years 1790, 94, 95, and 96.

The Doctor recommends the free use of mercury, both as a remedy and preventative—and says, "the officers of the army and "navy, who have leisure and can be prevailed upon, on their "arrival in the West-Indies, to undergo one or two courses of "mercury, take a few laxative medicines, after confining themselves "to a moderate use of wine, and living chiefly on vegetables and "fruits for the first two months after their arrival, may rely, almost "to a certainty, on escaping the fever."

ISAAC RAND.
JOHN WARREN.

ARTICLE IV.

On the Effects of Oil in Cases of the Bite of Serpents; republished from the Charleston (South-Carolina) City Gazette.

Messrs. FRENEAU and PAINE,

I READ with pleasure, in your paper of the 21st of November, "some short directions for the cure of the plague," composed from a small pamphlet lately published by Count Berchtold at Vienna, by the use of *sweet olive oil.*

To take off the sharp edge of misfortune, or to meliorate the condition of man, is a godlike employment. Count Berchtold will be deservedly classed by the philanthropist, among the benefactors to mankind.

In great cities, particularly in London, a number of persons procure their livelihood by catching vipers. They are employed by chemists, apothecaries, &c.

I remember, some years before leaving England, to have read, in the Philosophical Transactions of the Royal Society in London, a curious circumstance relative to one of these viper-catchers.

A member of the society had received, casually, information, that a man engaged in this business was frequently bitten, and that he cured himself by *sweet olive oil.* After considerable inquiry, the viper-catcher was found, and the questions asked, whether he did cure himself by the oil? and whether he was willing to gratify a number of gentlemen of the fact? The man answered affirmatively to both questions. Accordingly, a most numerous meeting of the Royal Society was convened, composed of a considerable number of the nobility, &c. The viper-catcher attended, accompanied by his wife, with a large viper, and laying his arm naked to the shoulder, suffered the irritated reptile to strike, which it did very forcibly. His wife permitted the poison to operate till her husband's head, face, and tongue were greatly swelled, his arm and face also very black, and his senses much affected, when he applied the oil, by pouring a small quantity down and bathing the part bitten. The man gradually and soon recovered.

This circumstance being strongly impressed upon my mind, and knowing that the poison of an English viper is considered in that country the most subtile in nature, determined me to try its antidotal power in the bite of the rattle-snake, the first opportunity which should offer, on my retirement from Charleston to the back country, now Pendleton County. I was also particularly impelled to make the trial, from a consideration of the newness and wildness of the country, and the number of my family, beside

which there were hardly a dozen more in the country. This was in the year 1786.

In about a month after my arrival, a person in full speed came to my camp, and most urgently begged to know if I could assist a man who had just been bitten by a very large rattle-snake. Although I lamented the misfortune, I rejoiced at the opportunity it offered to ascertain fully the property of olive oil as an antidote to this deadly poison; accordingly I put a phial of oil in my pocket, and mounted the messenger's horse.

When I arrived at the unfortunate man's cabin, he struck me as the most frightful object I had ever beheld. His head and face were prodigiously swelled, the latter black; his tongue proportionably enlarged, and out of his mouth: his eyes as it shooting from their sockets; his senses gone, and every appearance of immediate suffocation. He had been struck on the side of the foot, about the middle, in the hollow.

Immediately, but with great difficulty, I got down two tablespoons full of oil. Its effect was almost instantaneous, and astonishingly powerful in counteracting the poison, as appeared by the strong though quick convulsions that followed. In about 30 minutes it operated strongly, both emetically and cathartically; after which the swelling of the head, face, &c. gradually abated, and the tongue began to assume its place. In about two hours he was so far recovered as to be able to articulate, and from that time recovered fast. The oil, inwardly taken, and applied to the foot and leg, both exceedingly swelled, did not exceed seven or eight spoons full.

The number of cases, of a like nature, in the course of twelve years, has been considerable; in all which, olive oil has proved itself to be peculiarly adapted, and fully adequate to the worst of cases, if timely applied. It is a remedy which every person may command (may have at hand when others cannot be procured) and ought not to be without: indeed, many cautious people here carry a small phial of oil constantly about them. It has also been used with equal success when horses, cattle, and dogs have been bitten. Thus is the mind relieved from terror in those whose occupation subjects them to the bite of the snakes, from a well grounded confidence in the certain efficacy of the oil, and to which every one may have instant recurrence.

The case, I am informed, has occurred, where the oil succeeded, when given to a woman bitten by a mad dog, under strong symptoms of hydrophobia—but at present, I am not sufficiently in possession of particulars to warrant its communication.

I can hardly excuse myself of criminal neglect in having so long omitted to make thus public this sovereign antidote to the worst of animal poisons. The knowledge of the efficacy of the

olive oil is abundantly diffused in this county, and partially in some of the adjoining counties.

The insertion of the foregoing particulars in your City and Carolina Gazettes, must make its invaluable properties generally known.

With great esteem, I am, &c.

Pendleton County, July 4, 1798. J. MILLER.

FOREIGN.

ARTICLE I.

The following important Account of a new Publication in Great-Britain, by Dr. JENNER, *entitled* "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ, or Cow Pox," *is extracted from the Analytical Review for July*, 1798.

THE author of this inquiry observes, that the cow pox has been long known to farmers in the west of England: but its origin and effects have not been, till of late, properly ascertained. The disease appears on the nipples of cows, in the form of irregular pustules, which are, at first, of a pale blue, or somewhat livid colour, and surrounded by an extensive border of inflammation. These pustules often terminate in phagedenic ulcers, which prove extremely troublesome. The animals become feverish; and the secretion of milk is lessened. Domestics employed in milking the cows are presently affected about the joints, and at the extremities of the fingers, and sometimes on the wrists, with small vesications, or pustules. These enlarge, and suppurate quickly: they appear of a bluish colour, and have always a circular form, their edges being more elevated than their centres. Tumors arise in the axillæ; after which a considerable disorder of the constitution takes place for one, two, three, or four days, and is succeeded by ulcerations on the hands, very difficult to heal, and often phagedenic. Sores are likewise produced on the lips, nostrils, eyelids, &c. from carelessly rubbing these parts with the infected fingers.

Dr. Jenner is of opinion, that the cow pox is not generated by any previous disease of the cow, but that it originates from another animal in a diseased state. The supposed mode of its communication will be most properly delivered in the author's own words:

"In this dairy country a great number of cows are kept, and the office of milking is performed indiscriminately by men, and

maid servants. One of the former having been appointed to apply dressings to the heels of a *horse* affected with the *grease*, and not paying due attention to cleanliness, incautiously bears his part in milking the cows with some particles of the infectious matter adhering to his fingers. When this is the case, it commonly happens that a disease is communicated to the cows, and from the cows to the dairy maids, which spreads through the farm until most of the cattle and domestics feel its unpleasant consequences."

The circumstance which principally demands attention, in regard to the cow pox, is, that any person who has been once affected with it will never afterwards take the small pox, either by exposure to variolous effluvia, or by inoculation. This point, as well as the truth of his idea, respecting the origin of the disease, the author has endeavoured to establish by a variety of cases and experiments.

It appears farther, that those who have had the small pox, either escape the cow pox, or are disposed to take it slightly: thus, by milking infected cows they may get sores on the hand, without being sensible of any general disorder. Dr. Jenner, however, allows, that the cow pox does affect the same individual repeatedly: but he observes, that the second and third attacks are, in general, much more slight than the first.

Some other remarks or inferences, made by the author from his cases and experiments, deserve to be noticed.

1. He says, "One instance has occurred to me of the system being affected by the matter issuing from the heels of horses, and of its remaining afterwards unsusceptible of the variolous contagion; another, where the small pox appeared obscurely; and a third, in which its complete existence was positively ascertained. In order, therefore, effectually to shield the constitution from the small pox, it is necessary that a disease be generated by the morbid matter from the horse on the nipple of the cow, and passed through that medium to the human subject.

"2. When the cow pox was inoculated, pain in the axillæ, and febrile symptoms commenced on the 6th and 7th day after inoculation, and continued till the 10th. The appearances of the incisions, in their progress to a state of maturation, were much the same as when produced, in a similar manner, by variolous matter. The only observable variation consists in this, that the fluid of the cow pox remains limpid nearly to the time of its total disappearance, and never becomes purulent, as in the direct small pox.

"3. A child of five years old was inoculated with matter taken from the hand of one of the servants who had been infected by washing a mare's sore heels. He became feverish on the 6th day; but on the 8th was free from indisposition. Although the pustule

somewhat resembled a small pox pustule, yet its similitude was not so conspicuous as when excited by matter from the nipple of a cow, or by matter which had passed from thence through the medium of the human subject."

Dr. Jenner had not an opportunity of inoculating the same child for the small pox. "It, therefore, remains to be decided whether the matter of *grease*, passing immediately through the human constitution, will secure it afterwards from variolous infection.

"Three men, who washed the mare's heels, were, in consequence, affected with sores in their hands, followed by inflamed lymphatic glands in the arms and axillæ, shiverings, succeeded by heat, lassitude, and general pains in the limbs: but the disease terminated by a single paroxysm.

"4. Several children and adults were inoculated from the arm of a boy, to whom the disease had been transferred from a child five years and a half old, previously inoculated with matter taken from the nipple of an infected cow. The greater part of them sickened on the 6th day, and were well on the 7th; but in three of the number a secondary indisposition arose, in consequence of an extensive erysipelatous inflammation, which appeared on the inoculated arms; and which seemed to arise from an enlarged, painful state of the pustule. This complaint was relieved by the application of mercurial ointment to the inflamed parts.

"5. From the arm of one of the above patients four other children were inoculated. One did not take the infection. The arms of the rest inflamed, with the usual attendant symptoms. In order to prevent the diffuse, painful inflammation, a little mild caustic, made with equal parts of quick-lime and soap, was applied on the vesicle formed by the virus, and suffered to remain on it for six hours. This application answered the purpose, and gave the children no uneasiness. Moreover, within an hour afterwards the febrile symptoms ceased.

"6. Three of the children, thus inoculated, were, sometime afterward, inoculated with active, variolous matter: but the inflammation round the incisions subsided on the fourth day, and was scarcely perceptible on the sixth. No symptom of indisposition followed.

"The above experiments prove, that the matter, in passing from one human subject to another, through five gradations, had lost none of its original properties."

In some general observations, subjoined to the cases, Dr. Jenner offers several hints to the consideration of the inoculators of the small pox; and prosecutes farther the proper subject of his inquiry. He thinks, "the disease is produced only by the thin darkish-looking fluid oozing from the newly-formed cracks in the heels of horses, which is similar to the fluid discharged from

erysipelatous blisters." Pus, taken from old sores, seems to produce simple "inflammation," but not the cow pox. "The activity of the virus is much increased after it has acted on the nipples of the cow; for the horse very seldom affects his dresser with sores, whereas infected cows almost always convey their disease to the milk-maids." Dr. Jenner likewise thinks it probable, "that not only the heels of the horse, but other parts of the body of that animal, are capable of generating the virus which produces the cow pox."

With regard to the origin of the small pox, Dr. Jenner queries, "May it not be reasonably conjectured, that the source of the small pox is morbid matter of a peculiar kind, generated by a disease in the horse; and that accidental circumstances may have, again and again, arisen, still working new changes upon it, until it has acquired the contagious and malignant form, under which we now commonly see it making its devastations among us? May we not also conceive, that many other contagious diseases owe their present appearance not to a simple, but to a compound origin?"

Lastly, Dr. Jenner proposes to substitute the inoculation of the cow pox in the place of that of the small pox. "Inoculation of the small pox," he observes, "often produces deformity of the skin; and always creates a painful solicitude, especially in families predisposed to take the disease unfavourably. Its effect is uncertain, as to the number of pustules which may be produced; and their excess is what we chiefly dread in the small pox. In constitutions disposed to scrophula, the inoculated small pox, however mild, frequently rouses into activity that distressful malady."

The advantages of inoculating the cow pox, instead of the small pox, are stated nearly as follows:

"1. It clearly appears that the former process would leave the constitution in a state of perfect security from the infection of the small pox.

"2. In the cow pox no eruption of pustules takes place over the body.

"3. The disease, when received, cannot be communicated to other persons by effluvia; nor, perhaps, by simple contact, unless there be some abrasion of the cuticle.

"4. No fatal effects have ever been known to arise from the cow pox, even when impressed in the most unfavourable manner, so as to produce extensive inflammations and suppurations on the hands."

THE

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ADVERTISEMENT.

THE increasing circulation of the Medical Repository, *and the liberal reception it meets with from the public, demand the acknowledgment of the Editors, and will undoubtedly animate their future exertions. To deserve well of their country, by endeavouring to promote its essential interests, is the highest object of their ambition.*

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Communications for the Repository may be addressed, as usual, to either of the subscribers,

SAMUEL L. MITCHILL, *Columbia College.*
EDWARD MILLER, *No.* 158 *Broadway.*

New-York, 2d Feb. 1799.

MEDICAL REPOSITORY.

VOL. II.—No. III.

ARTICLE I.

EXPERIMENTS *relating to the* CALCES *of* METALS; *communicated in a fifth Letter from Dr.* PRIESTLEY *to Dr.* MITCHILL, *dated Northumberland, October* 11, 1798.

DEAR SIR,

AS I have no other view in this discussion than to discover the truth with respect to the question which I have brought before the public, I shall communicate, with the same freedom, what occurs to me in favour of the new system, and facts that seem to make against it. I therefore frankly acknowledge, that I have laid too much stress on the argument from finery cinder not dephlogisticating (or only in the slightest degree) the marine acid, having thought this to be a proof of its containing little or no oxygene. For this effect is not always produced by red precipitate, which is known to contain a large proportion of oxygene, or pure air; nor by flowers of zinc, of which it is always taken for granted to contain much.

On the first pouring of spirit of salt on the red precipitate fresh made, I have had an evident smell of dephlogisticated marine acid, but not afterwards. Also the black powder of mercury and lead, which gives pure air by heat, does not dephlogisticate marine acid, though it makes it give an offensive smell. But then there is other evidence of these substances containing oxygene, not only when exposed to heat, but, with respect to the red precipitate, even when dissolved in the marine acid; and there is no evidence, of any kind, that finery cinder contains this principle. For this solution of the red precipitate, heated with a burning lens, in atmospherical air, causes an addition to its quantity, from the dephlogisticated air expelled from it; whereas, when the solution of finery cinder is treated in the same manner, the contrary effect is produced: the quantity of air is diminished, and the remainder is less pure than before. The same was also the consequence of heating a solution of iron in the same circumstances, and that of finery

cinder precipitated by caustic volatile alkali, and of iron treated in the same manner. Since, therefore, finery cinder, both in this solution and without it, has the same effect on atmospherical air, in which it is heated, that iron has, I conclude that they both contain the same principle, though the finery cinder has much less of it than iron. The same is probable from finery cinder being attracted by the magnet.

Another evidence of a calx containing pure air, or oxygene, is, that when it is revived in inflammable air, fixed air is produced. But this is not the case when finery cinder is revived in these circumstances, though I purposely prepared some by melting iron in the open air; in which case I had imagined that some pure air would be attached to it. In making this finery cinder I observed that steel gained no sensible addition of weight in the process, and even much less than when it is made by means of steam, in a close vessel. When it was prepared in a glass receiver, standing in water, by means of a burning lens, it gained weight; but when it was done over mercury, the addition to its weight was little or nothing.

Since an iron tube is dissolved by heating manganese in it, I thought it very possible that some dephlogisticated air from this substance might unite with the iron, and that the finery cinder made in this manner might be found to contain some. But when I lately heated some iron, affected in this manner, in inflammable air, I did not find any fixed air in the residuum; so that it appeared to have got nothing but *water* from the manganese; being the same thing with the finery cinder which is made by means of steam. Though, therefore, finery cinder not dephlogisticating marine acid, is no proof of its not containing oxygene, no positive evidence has yet been produced that it does, while there is every presumption that it does not; and an entire new system of chemistry cannot be admitted on mere possibilities.

Whenever inflammable air is procured by means of a metal, since water is always present, the antiphlogistians say that it comes from the decomposition of that water. But since they say that water consists of 85 parts of oxygene to 15 of hydrogene, there ought to be some evidence of the production of this proportion of oxygene at the same time; and yet this has not been done by any proper evidence, which is the production of some acid, of dephlogisticated air, or of some substance into which it is acknowledged to enter.

The only reply of the antiphlogistians has been, that whenever inflammable air is procured by means of any metal, that metal is reduced to a calx, and this calx, weighing more than the metal, must contain the oxygene required. And, because the calx of mercury yields dephlogisticated air, and its additional weight is

owing to it, they presume that *all* metallic calces derive their additional weight from the same cause; and, therefore, they do not hesitate, in their new nomenclature, to call them all, without exception, *oxyds*. Thus they call finery cinder a *black oxyd of iron*, though they produce no direct evidence of its containing any oxygene at all. But it by no means follows, that because one calx of a metal owes its additional weight to oxygene, all the rest do so.

Indeed, the calces of the same metals are, in this and in other respects, very different from one another. Finery cinder, for example, is a very different thing from the common rust of iron, consisting of different principles. From finery cinder nothing can be got by mere heat, but from the rust of iron a quantity of fixed air may be extracted. From 1277 grains of this rust, I got 45 ounce measures of air, of which only about a thirtieth part was not fixed air. The remainder (of the standard of 1. 6.) was slightly inflammable, probably from the gun-barrel in which the experiment was made.

The addition that is made to iron by rusting in the open air, I do not find to be more than 30 or 40 grains to an ounce; whereas, the addition made to iron, when it is converted into finery cinder, is near one half of its original weight. I find, however, much variety in this respect. When the finery cinder is made with a burning lens, in the open air, the addition to its weight is the least; and when it is made in close vessels, with steam, it is the greatest. Yet, notwithstanding this great difference between finery cinder and the common rust of iron, the antiphlogistians scruple not to say, but without any examination, that finery cinder is an imperfect oxyd of iron, and the common rust a more perfect one. But if finery cinder ever be converted into rust, which I have never found to be the case, it must, by some process or other, natural or artificial, be first converted into iron, in which case it will lose much of its weight.

The only circumstance that gives any plausibility to the opinion of finery cinder being an oxyd of iron, is the addition that is made to the weight of the iron. But when zinc is treated in the same manner, steam being sent over it in a red heat, the inflammable air is procured, the zinc gains no addition of weight; so that, in this case, there is no pretence whatever for saying that the water is decomposed. The substance that is produced in these circumstances I have somewhere called *flowers of zinc;* because it is a *calx of zinc;* and, at that time, I presumed that it must have all the properties of the common flowers of zinc, which may contain oxygene. But I have treated this peculiar calx of zinc, made without access of air, in all the methods that I can think of, without being able to find any sign of oxygene in it any more

than in finery cinder. When I heated it in common air, the air was not increased, but diminished—the same effect that is produced by heating finery cinder.

As I could find no oxygene in the precipitates of iron dissolved in acids, I have not been able to find any in those of zinc. The most unexceptionable that I could think of is that by caustic volatile alkali. This substance I heated in atmospherical air, both moist and dry, lest exposure to the atmosphere should make some difference in it, but with the same result. The air in which it was heated was rendered much worse than common air, though, in one case, the quantity was increased from $6\frac{1}{2}$ to 8 ounce measures. Of this, half an ounce measure was fixed air, and the remainder of the standard of 1. 8. extinguishing a candle; so that it was almost wholly phlogisticated. It therefore seemed to have imbibed part of the pure air, and to have given out phlogisticated air.

Filings of zinc yield much inflammable air in pure water, though I do not find that they can, by this means, be reduced to a complete calx. But the imperfect calx to which the metal is by this means reduced, does not appear to contain any oxygene. When it was heated in atmospherical air, the quantity of air was increased; about one twentieth of it was fixed air, and the remainder was of the standard of 1. 5. The water in which the filings of zinc had been immersed gave out air much worse than common air, and it was perfectly free from acidity. Iron filings will also yield inflammable air in water, and this water also gives out air that is worse than common air, as does the water over which tin and other metals are calcined.

That the calces of metals do, in general, contain oxygene, I have no doubt, because the dephlogisticated part of the atmospherical air disappears when they are calcined in it. But there is reason to think, that a great part of the addition of weight which they thereby acquire is mere *water*, while the oxygene attaches itself to other substances in preference to the calx, if they be present. One instance of this is, that when they are calcined over lime-water, the lime is precipitated; whereas, if the calx had imbibed all the dephlogisticated air that disappeared, the lime-water would not have been affected by the process: this precipitation of the lime coming, no doubt, from fixed air, which I have sufficiently proved to consist of dephlogisticated air and phlogiston, or the base of inflammable air. I had this result when I calcined iron, zinc, tin, lead, bismuth, and regulus of antimony, in those circumstances. But when the process was made over mercury I could not always find any, and, therefore, presume that all the oxygene was imbibed by the calx, though it may be impossible, in some cases, to extract it again in that form: for, when the

quantity is small, it may be so united to the phlogiston remaining in the calx, as to form the basis of phlogisticated air, which I have proved to consist of dephlogisticated and inflammable air.

Lead furnishes an example of this. No oxygene, I believe, can, by any means, be got from massicot, though it has imbibed some; but when this calx is supersaturated with it, and becomes *minium*, it will yield the purest dephlogisticated air by heat only, and will likewise dephlogisticate marine acid. And, since flowers of zinc will not dephlogisticate marine acid, I presume that this calx also is nearly in the same state with massicot in this respect; and that, in any state, it contains but little oxygene, or so united to phlogiston as not to be obtained either in the form of acid or of dephlogisticated air.

Though the flowers of zinc may contain some oxygene, I have not been able to discover any in them by any process that I have made use of for the purpose. As this substance is made in a considerable degree of heat, I was not surprized to find that heat would not expel any thing from it; but I thought that when it was mixed with iron filings, it might, with them, yield some fixed air, as red precipitate does. But this I did not find to be the case. I got nothing in this process besides inflammable air, as I should have done with finery cinder. Also, when mixed with perfect charcoal, such as gives no air by heat, a great quantity of both fixed and inflammable air is produced, which shews that, like this substance, flowers of zinc contain little or nothing besides water, which will have just the same effect.

To make this experiment with fairness, the iron filings must be heated till they give no air. They must then be well washed till the water put on them be quite clear, and be again found to give no fixed air by heat: for foreign substances are very apt to be mixed with iron filings, which this process will separate. With iron filings, thus prepared, red precipitate gave fixed air, but flowers of zinc none.

There is a *grey calx of zinc*, similar to that of lead, which Mr. Chaptal calls a perfect oxyd. This I find to be only zinc partially calcined. For, on heating it in atmospherical air, it became white: the air was diminished, was without fixed air, and considerably phlogisticated. The perfect flowers of zinc, treated in the same manner, made no sensible change in the quantity of the air; but, as in the former case, there was no fixed air in it, and it was considerably phlogisticated.

The melting of massicot, in these circumstances, made no change, of any kind, in the air; which shows that it contains less phlogiston than flowers of zinc.

Oxygene, in a calx, is, perhaps, most easily detected by its forming fixed air when it is heated in inflammable air. But I did

not find this to be the result of an attempt that I made to revive flowers of zinc in those circumstances. Owing to the whiteness of this substance, which disposes it to reflect, and not to absorb, the light that is thrown upon it, I could not revive any part of this calx completely: a black spot only was made on a part of it, and about an ounce measure of the inflammable air was imbibed; but I found no fixed air in the remainder, any more than I did when I revived finery cinder in that process.

With much respect,
I am,
Dear Sir,
Yours sincerely,

J. PRIESTLEY.

ARTICLE II.

Of some Experiments made with IVORY BLACK, *and also with* DIAMONDS; *communicated in a sixth Letter from Dr.* PRIESTLEY *to Dr.* MITCHILL, *dated October* 11, 1798.

DEAR SIR,

MOST of the substances which have been used to phlogisticate air gain an addition to their weight in the process; in consequence of which it has been taken for granted by the antiphlogistians, that nothing is emitted from them, and that they only imbibe the dephlogisticated air, which is one constituent part of the atmosphere, leaving the other part, which they call *azote*, unaltered. It was, therefore, desirable to find some substance which would not gain any weight in the process, and yet have the same effect in phlogisticating the air: for the dephlogisticated air, not uniting with the substance exposed to it, must necessarily form some other combination.

This end was, in some measure, answered by *steel*, which, according to the common hypothesis, containing more phlogiston than iron, would, I thought, part with more on the application of heat, and receive less addition; and this I found to be the case. But it was more completely answered by *black bones*, which, without gaining any thing by the application of heat, in any circumstances, became *white* in the process. If this be done in common air, as the bones do not imbibe the dephlogisticated air which disappears, this air is disposed of in two different ways: for one part of it contributes to form *fixed air*, and another part forms a different union with something emitted from the bones, and makes an addition to the phlogisticated air. Accordingly, there is more of it found after this process with the black bones than with iron, and many other substances which receive an addition of weight in the process. Whence then, I ask, can come this addition of phlogisticated air, but from an union of phlogiston emitted from the bones, and the dephlogisticated air in the atmospherical air to which they are exposed? Consequently, phlogisticated air, or azote, is not a simple substance, as the antiphlogistians maintain, but a compound. Also, whence can come the *fixed air* that is procured in the same process, but from a different combination of the same elements, and not, as they say, from *carbone*, which is a substance of vegetable origin, and has no place here?

That the thing which constitutes the *blackness* of the bones is the same with that which has always been called phlogiston, is evident from its forming inflammable air, if there be water to supply it with a basis: for I now find, that if they be heated in phlogisticated air, which cannot, by parting with any thing, contribute to their whiteness, they, nevertheless, become white, the air is increased in quantity, and this increase is inflammable air.

For these experiments I find *ivory black*, which is the coal of ivory, used by painters, more convenient than the bones I used before. To prepare this substance for the experiments, I fill an earthen tube with it, and, closing it with clay, expose it, for a considerable time, at least a quarter of an hour, to the greatest heat of a smith's fire, which will expel from it every thing that is volatile; so that no heat that I can apply to it afterwards will affect it, except by means of some other substance with which that which constitutes its blackness has an affinity, and with which it can combine.

Heating a quantity of ivory black, prepared in this manner, in $6\frac{1}{2}$ ounce measures of dephlogisticated atmospherical air, there was no sensible change produced in its quantity; but, on examining it, I found in it one ounce measure of fixed air, and the remainder completely phlogisticated, which is in the proportion of 84 parts in 100: whereas, the antiphlogistians say, that any portion of atmospherical air contains only 73 parts in 100 of phlogisticated air. It is evident, also, that both these substances, viz. fixed air and phlogisticated air, consist of the same elements, viz. dephlogisticated air and phlogiston.

The very different proportions in which atmospherical air is diminished in different processes, is a proof that, in some of them, there must be a generation of phlogisticated air. When air is diminished by iron filings and sulphur, moistened with water, the proportion of phlogisticated air is that which Mr. Lavoisier states, viz. 73 parts in 100. But when I made the mixture without any water, I found that 110 measures were, in six days, reduced only 0 90, completely phlogisticated, which is in the proportion of 81. 8 in 100. Again; 140 ounce measures were, by the same dry mixture, reduced to 113, which is in the proportion of 80. 6 in 100. But some water getting to the mixture, the third time that it was used, 155 ounce measures of air were reduced by it to 116, which is in the proportion of 74 in 100.

By the slow burning of *phosphorus* 60 ounce measures of atmospherical air were reduced to 48, at another time to 48. 5. and 50 ounce measures were reduced to 40, which is in the proportion of 80 parts of phlogisticated air in 100. But by repeatedly firing the phosphorus with a burning lens, 100 ounce measures were reduced only to 89, completely phlogisticated.

That the *diamond* is a combustible substance has been long known; but not having heard of its being burned in atmospherical, or any other kind of confined air, I long wished to do it; and, being supplied by a friend with two small ones, I treated them in this manner, and found that near 90 parts in 100 of the air in which they were burned was completely phlogisticated, and the quantity not being sensibly changed, the remainder was fixed air, which is an effect similar to that of heating *charcoal of copper* in air. The diamonds being very small, and the quantity of air in which they were burned being small in proportion, I will not vouch for much exactness in the result, though the experiment was carefully made over mercury. Whenever I get larger diamonds I will endeavour to make the experiment in a more satisfactory manner. Both the diamonds weighed only three tenths of a grain, and they lost in the process fifteen hundredths of a grain. The air in which they were burned was three fourths of an ounce measure.

I am,
Dear Sir,
Yours sincerely,
J. PRIESTLEY.

ARTICLE III.

An Account of a supposed Artificial Wall, discovered under the Surface of the Earth in North-Carolina; in a Letter from the Rev. JAMES HALL, *A. M. to* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, &c.*

SIR, *Philadelphia, May* 25, 1798.

NEAR the confluence of South Yadkin and Third Creek, about fourteen miles from Salisbury, in North-Carolina, a phenomenon of great antiquity has been discovered, which has engaged the attention of the curious in that part of the State, and which I have lately endeavoured to explore.

During the heavy rains which fell in the summer of 1794, a cavern of about eight feet deep was formed in the side of a hill, near a small stream of water, by the successive torrents of rain-water which issued from an adjacent field.

The hill is between two and three poles in surface where the cavern is formed, about the middle of which stands a subterranean wall, composed of small stones, laid in a white cement, resembling lime of a very fine texture. The largest stones, among many hundreds which I have examined, do not, in my opinion, exceed twelve pounds in weight, and from that are to be found of all sizes down to the weight of one ounce.

The species of stone is what the Irish call the *black whin;* nor is any other kind of stone to be found in the wall.

The stones incline to an oblong, though they are very irregular in their form.

They are universally laid across the wall; and the angles of each stone are so fitted by those contiguous to it, that it is difficult to enter the edge of a mattock between them, although the cement has lost its tenacious quality, and is as moist as the surrounding earth.

The cement I have examined in not less than forty different places in the wall, and could not find among it any appearance of sand, or common earth, except where there has been an opportunity of the earth mingling with it from the top of the wall.

Both sides of the wall are plaistered with the cement, so that not a stone has appeared when the wall was completed, supposing it to be a work of art; and that this is the case is, in my opinion, evident from this circumstance; that where the cement was washed off from the surface of the wall, hundreds of small stones appeared

within a small space, as if slipped in between the ends of the stones, where they could not be brought into contact, to fill up the chasms with the cement about them; and from the apparent nature and situation of the materials, it appears probable to me, that when the wall was dry, and above ground, it was nearly as firm as a solid rock of the same dimensions.

The wall is about two feet thick, built in a straight line, and perpendicular. It has been traced about ninety feet down the stream below the cavern, and, perhaps, double that distance in the opposite direction. That part I did not measure.

The top of the wall, at an average, is between two and three feet below the surface of the earth, both above and below the cavern, although the situation of the ground on the two sides is very different.

Above the cavern the hill rises abruptly, where the wall rises with it, and, in a few poles, the ground becomes almost level, the stream bearing considerably from the wall.

Below the cavern the wall runs parallel to, and along the declivity of the hill; so that, as far as the wall has been explored, the end which is up the stream is, by a horizontal level, fifteen, perhaps twenty, feet higher than the other.

Where the wall bends over the hill the stones lie in a much more detached situation than in any other place which I examined, and appear as if the lower end had sunk when the cement was in a state of moisture, so as to admit the stones to be drawn asunder, rather than make any particular chasm.

Two circumstances have much excited my curiosity respecting the wall: one is, that it has been explored five feet lower than the surface of the adjacent stream, which runs not more than forty feet distant from the wall, without any appearance of its termination downwards, or of any end, corner or opening discovered in the distance of near three hundred feet in length where it has been traced. The other is, that a coarse gravelly rock embraced the wall on both sides, increasing in hardness as far as the wall has been examined in depth; from which I think these two facts are evident, that, at the time the wall was built, the adjacent stream had no existence in that place; and that, since that time, the rock has been generated.

The wall has had so little tendency to form a concretion with the rock, that, as far downwards as the rock would yield to the mattock where it was dug away, the plaistering stood smooth and entire; and, where the rock is too hard to be dug, and the wall was removed, the cheeks of the rock which embrace the wall are as level and smooth as the plaistering against which it rested. This, I think, incontestibly proves, that the rock has been formed after the wall was constructed.

The depth at which the wall has been examined is supposed to be about fourteen feet. This I could not exactly ascertain, as the wall had been demolished for near sixty feet in length.

It is my intention, if health permit, next August, to endeavour to carry forward a further inquiry, the result of which you may expect by the first convenient opportunity.

I am, Sir,
With much esteem,
Your obedient servant,
JAMES HALL, jun.

Dr. WOODHOUSE.

ARTICLE IV.

Dr. WOODHOUSE's REPLY.

Sir,

I HAVE read your account of a supposed artificial wall, discovered under the surface of the earth, in North-Carolina, with great attention.

I am well satisfied, from several specimens of the stones which I have seen composing this wall, that it consists of a mineral substance called basaltes, and that it is a production of nature, and not of art.

My reasons for this opinion are as follow:

The stones answer the description of basaltes given by various writers. They are found of an irregular form, in prisms consisting of several sides, and are of different sizes; some being so small as to weigh no more than one ounce, while others exceed the weight of twelve pounds. The angles fit each other exactly like the basaltes, and appear as if joined by the hand of a skilful workman.

There is a brown ochreous matter found upon the surfaces of these stones, exactly like that on some of the basaltes of other countries. This ochre arises from a chemical decomposition of the stone, called by some spontaneous calcination, and by others efflorescence.

The decomposition is owing to the iron contained in the stones, and its calcination by air and water.*

Fourcroy has improperly attributed the brown crust with which the stones are covered, to water depositing different kinds of earth between the sides of the basaltic columns; and in Nicholson's Chemical Dictionary† it is called cement with equal impropriety. Columns of the Giant's Causeway, says the compiler of the Dictionary, fit accurately together, being, in some instances, united by a strong cement.

That the brown crust which adheres to the stones, and the fine white friable matter with which you suppose the wall has been

* Il eſt facile de voir que cette decompoſition, cette friabilité dependent du fer qui eſt contenu dans ces pierres, et de ſon oxidation par l'air et par l'eau. French Encyclopædia, art. baſaltes.

† Art. baſaltes.

plaistered, are owing to chemical decomposition, appears evident from the following circumstances: If the brown ochre is carefully scraped off from the stone, the surface will be found to be not of so firm a texture as the internal part; and the white powder, brown crust, and internal part of the stone, are composed of the same principle, in nearly the same proportions.

In some countries the basaltes are so much calcined as to fall to pieces on being removed.

The regularity of the wall, and the number of small stones which appear as if slipped in between the ends of the stones, are no proofs of its being a production of art. The basaltes, in Italy, appear like piles of wood of equal thickness throughout, and extend to a considerable distance. The small stones may have been carried down from the surface of the earth by rain, and deposited in the places where they are now found.

I do not suppose that the rock which embraces the wall, and which, from the specimen you have shewn me, is granite, was formed after the wall, granite being among the first formed substances in nature. The rock has probably been burst asunder by the wall, which is, perhaps, of volcanic origin.

In Cronstedt's Mineralogy there is an account, by Mr. Latrobe, of a rock of granite in Upper Lusatia, which has been rent asunder by a vein of concentric basaltes. In Italy basaltes are often found resting upon a bed of granite.

That there have been volcanos in North-Carolina appears from some specimens of lava sent from that part to this city.

The following experiments were made in order to ascertain the component parts of the American basaltes:

EXPERIMENT I.

One hundred grains of the solid stone were reduced into an impalpable powder, and boiled half an hour in half an ounce of nitric acid, diluted with one ounce of water. The whole was placed upon a filter, and distilled water was added until it passed through the filter—insipid to the taste. The powder remaining upon the filter was siliceous earth, and, when dry, weighed exactly fifty-eight grains.

EXPERIMENT II.

A solution of pot-ash was added to the fluid which passed through the filter until no precipitation took place. The precipitated matter was carefully washed in a large quantity of distilled water, and, when dried, weighed forty grains.

EXPERIMENT III.

This dried precipitate was boiled half an hour in distilled vinegar, in order to dissolve the lime and magnesia which it might contain. The vinegar was filtered and evaporated to dryness. Diluted sulphuric acid was added to the dry matter, in order to form selenite, or the sulphate of lime, and Epsom salt, or the sulphate of magnesia. Distilled water was added to separate the sulphate of magnesia from the insoluble sulphate of lime.

The magnesia was precipitated by a solution of pot-ash, and, when dried, weighed three grains.

EXPERIMENT IV.

That part of the dried precipitate, mentioned in the second experiment, which was not acted upon by the vinegar, weighed twenty-nine grains. It was dissolved in diluted nitric acid, and a solution of the prussiate of pot-ash was added until no precipitation took place. The prussiate of iron was separated by a filter, boiled in a solution of pot-ash, washed well with distilled water, and dried, when it weighed ten grains.

EXPERIMENT V.

A solution of pot-ash was added to the filtered liquor of the last experiment, until no precipitation took place. The precipitate, which was alumine, was well washed in distilled water, and, when dry, weighed sixteen grains.

The proportions of the ingredients composing the American basaltes, from these experiments, are fifty-eight parts of siliceous earth, sixteen of argillaceous, three of magnesia, and ten of iron, which, added together, make eighty-seven. Counting two grains lost in the first experiment, and five in the other, we will have ninety-four grains, which, with six allowed for the lime, will make one hundred grains.

One hundred grains of the white friable matter called cement, and the same quantity of the ochreous crust, were subjected to the same kind of experiments, and gave the following result:

	Silex.	Alumine.	Lime.	Mag.	Iron.	Loss.
White friable powder,	55	16	5	3	12	9
Brown ochreous crust,	54	15	6	3	11	11
Powdered stone,	58	16	6	3	10	7

Upon comparing this analysis with those of Bergman, Mongez, and Faujas de Saint Fond, no great difference will be found in the proportion of the ingredients composing the American basaltes and those of other countries.

Analysis by Bergman, Mongez, Faujas de Saint Fond:

Silex,	52	56	46	
Argillaceous earth,	15	15	30	
Lime,	8	4	10	
Iron,	25	25	8	
			6	Magnesia.
	100	100		
			100	

This wall is certainly a great curiosity, and will afford ample room for the speculation of philosophers.

I should be happy to receive any further information upon the subject.

I am, Sir, with the greatest respect,

Your most obedient and humble servant,

JAMES WOODHOUSE.

Rev. JAMES HALL.
June 1, 1798.

ARTICLE V.

Experiments with the EUDIOMETER, *made at Martinique, by Dr.* GEORGE DAVIDSON; *communicated to Dr.* MITCHILL, *in a Letter dated Fort-Royal, April* 7, 1798. (See our vol. i. No. 2. p. 167.)

I HAVE already mentioned the large proportion of oxygene contained in the atmospheric air within the tropics. Having, by accident, got the eudiometer which I had borrowed from Mr. Baker broken, I wrote to my friend George Wilson, of Bedford-street, to send one to your address, and one out here. I have since repeated the experiment, both in the town of Fort-Royal and the neighbouring heights. With equal measures of nitrous air obtained from brass wire, and atmospheric air, there was an absorption of 67. 100. but with two measures of atmospheric air, there was somewhat less, from 52. 100. to 58. 100. that is to say, from three measures, or three hundred parts, there was left two and 42. 100. to 48. 100. I have also tried a mixture of sulphur and iron-filings in a glass cylindrical tube, and found above $\frac{4}{10}$ths of the air diminished. As those experiments were made in the presence of a number of medical gentlemen, who have certified the fact, as they have observed it themselves, I can, therefore, with confidence, speak to the result of our experiments.

We shall now be more easily able to account for the speedy rusting of metals, without having recourse to the action of supposed muriatic soda dissolved in the air. The rancidity of oils, and the speedy fermentation of vinous liquors, may, perhaps, be also owing to the greater heat of the climate; but metals would be less apt to contract rust from the greater heat, if the air contained only the proportion of oxygene which it contains in Europe. Consumptions here are also more quickly fatal than they are in Europe. On some of the West-India islands, such as Barbadoes and Antigua, where less rain falls, and where the heat of the air is kept at a steady temperature by their smallness, and the trade winds blowing over the whole island, without being diverted by high or woody land, consumptions are not less fatal than in the larger and moister islands. This is a fact which all writers upon diseases of the West-Indies take notice of, and which we would principally endeavour to account for from the air being more highly charged with oxygene than it is in Europe. If people, labouring under pulmonary consumption, are sometimes benefited by sea voyages within the tropics, we are to look for the temporary re-

lief afforded in the sea-sickness; the irritable state of the stomach by sympathy preventing the lungs acting in decompounding and absorbing oxygene; and in the determination to the surface carrying off the redundancy by the skin. Their costive habit, whilst at sea, proves that there is more than usual determination to the surface—hence relief to the lungs.

To which are subjoined the two following Certificates. *The respectability of the Witnesses would appear to put the Facts quite out of doubt. The first is from Dr.* CHISHOLM.

[*Within two miles of Fort-Royal, upon an elevated situation.*]

DEAR SIR,

IT is with pleasure I comply with your request respecting the proportion of oxygene in the atmosphere at this place, as ascertained, a few days ago, by means of your eudiometer, and by a composition of steel filings and sulphur. By the first, the quantity, I think, was about 56. 100 parts: for although 57 was given by one trial, yet the medium of all those made was no more than 56. A similar result was given by the common glass tube—a proof I should imagine of the accuracy of the experiment made with the eudiometer. The result of the trials with the filings of steel and sulphur, I think, was about 40. 100 parts. It appears to me to be a singular circumstance, that, although the ground on which the Ordnance Hospital stands is a perfect morass, partially drained, yet a result almost exactly similar to that given by the experiments made with the eudiometer at my house, should take place, with the same instrument, and under circumstances in no way different. The proportion at the Ordnance Hospital, I think, has been 58. 100: and at your house, in the Grand Rue, a situation less swampy, and nearer the sea, it has been 67. 100.

The situation of this place is high, dry, and enjoys as pure an air as it is possible to have in this country. An explanation of so singular a result, in situations so different, is, perhaps, more to be wished for than expected.

I am,
Dear Sir,
Very sincerely yours,
C. CHISHOLM, M. D.
Inspector of Ordnance Hospitals.

Dr. DAVIDSON,
Fort-Royal.

The second is from Capt. HARVEY *and Surgeon* LINDESAY.

WE, whose names are hereunto subscribed, do certify, that we have seen the experiments mentioned in the former part of the letter upon the composition of the atmospheric air, which were made both with Fontana's eudiometer and a cylindrical tube, with nitrous air, obtained from the dissolution of brass in the nitrous acid; and that we found 57. 100. of vital air absorbed in the former, and above half by the latter.

W. M. HARVEY, *Captain,* } *1st West-*
JOHN LINDESAY, *Surgeon,* } *India Reg.*

ARTICLE VI.

Account of the CACHEXIA AFRICANA; *a Disease incidental to Negro Slaves lately imported into the West-Indies.*

By the same.

THERE is a disease to which the negroes, and particularly those lately imported, are much subject: it is named by us *Mal d'Estomac*, or *Cachexia Africana;* and, from a constant symptom which attends it, *dirt eating* by some. (Dr. Hunter. Diseases of Jamaica.) Negroes also, who have been some time in the country, are subject to it, but not so frequently as amongst the former. It occurs in those who have, generally speaking, been badly cloathed, ill fed and lodged, and whose constitutions have been worn out by hard labour. The mind, partaking of the sufferings of the body, is affected with nostalgia, brooding over their ill treatment, separated forever from their friends and relations, and doomed to suffer without daring to complain.

As this disease is strongly illustrative (in my opinion) of the new chemical application, you will forgive my trespassing a few moments upon your time, by giving you a short history, and some few remarks.

The first symptom, and which, indeed, is both the cause and effect, is a fondness for solitude, sadness, grief and despondency, a loss of appetite, or a desire only for what is pungent and stimulant, difficulty of breathing, especially in walking up a hill, a painful gastrodynia, palpitation of the heart, general debility, drowsiness, paleness of the face and palms of the hands, the tongue white, sometimes with an appearance like stains of ink upon it, the lips colourless, the tunica adnata of a glassy whiteness, as also the teeth, the skin of an olive complexion, and cold to the touch, rough upon the surface, the papillæ elevated. Anasarcous swellings of the eye-lids, face and extremities; water is afterwards collected in the belly and chest, and the unhappy sufferer can only breathe in an erect posture, for fear of instant suffocation. The pulse is always small, feeble, and generally increased in frequency towards night. There is, throughout the disease, an unwillingness to attempt motion, and inability to perform it.

The same morbid changes take place throughout the alimentary canal. In consequence of the vitiated state of the gastric juice and impeded digestion, a morbid acidity prevails, and a symptom arises from this cause, which, with some, has given name to the

disease—a habit of eating chalk, dirt, or whatever will obtund acrimony.

This vitiated action is propagated throughout the whole alimentary canal; the lacteals, abraded by the acrimony of new fluids, no longer possess the property of absorbing healthy chyle; hence the lymphatic glands of the mesentery become inflamed and indurated. The blood poor, vapid, and colourless, no longer stimulates the heart and arteries to action; hence asphyxia and sudden death, and those polypose concretions found in the heart after death.

It is to the want of irritability of the blood, that we are to ascribe obstruction of the menstrual flux in women, in this disease.

From this short account of the disease, which has no other merit than truth, you will be prepared for the appearances upon dissection.

The stomach is found much enlarged, and thickened in its coats; the liver sometimes enlarged and schirrous, but always whiter than usual; the gall-bladder sometimes with biliary concretions; the bile never of a healthy appearance, generally thin and watery, and slightly yellow or green; the mesenteric glands indurated and schirrous. Those appearances induced a medical practitioner in a neighbouring island to employ mercury, with a view of removing, as he supposed, obstructions, but a very small quantity of it excited such terrible effects as to oblige him to desist. Accumulated irritability, from the abstraction of the usual stimuli, had rendered them more suscepible to the slightest stimulus.

From this view of the disease, the pathology and treatment of it, I conceive, will be easily understood. Resembling scurvy in some respects, it differs from it only in the symptoms of putrid diathesis not being so obvious—putrid animal food not having been here employed as an article of diet. The same defect of oxygene prevails in both diseases; and it is probable we would find the same benefit from the employment of acescent vegetables; but we have not here the same putrid diathesis to obviate, and the stomach has been already so much debilitated by poor vapid vegetable diet, that it requires a more stimulant plan—animal food, wine, warm cloathing, a gentle treatment. The preparations of iron are here found of the most essential service. Much benefit has also been derived from fermented weak liquors—acescent cane liquor has cured many.

Perhaps there may be also a deficiency of carbon.

I am inclined to think that the lungs have a greater share in separating oxygene than the stomach and alimentary canal; but from the mutual sympathy which subsists betwixt the stomach and lungs, a vigorous action of the former is required to enable the lungs to perform their appropriated action. I conceive, that to

produce scurvy, the abstraction of the usual stimuli, as in the disease, the history of which I have just now given, will be sufficient.

It is remarkable that negroes, subject to this disease, have been much benefited by living in a low situation, near to marshes, which quickly prove fatal to whites; and I have long ago observed this, before I had formed any theory upon the subject. Perhaps the hydro-carbonic air may act as a cordial—It is, perhaps, the nervous æther itself. It has been remarked by medical writers, that the attack of remittent marsh fevers is frequently preceded by an unusual flow of spirits. The system seems to suffer from too high a degree of excitement.

ARTICLE VII.

Concerning the MALIGNANT PESTILENTIAL FEVER *of* GRENADA, *as it appeared in* 1793 *and* 1794; *in a Letter from Dr.* C. CHISHOLM *to the late Dr.* E. H. SMITH.

[The following letter is a reply to ſome remarks on Dr. CHISHOLM's Eſſay on the Malignant Peſtilential Fever of Grenada, by our late colleague Dr. SMITH.* We take the liberty to ſuppreſs ſeveral harſh paſſages in this letter; becauſe the gentleman to whom it is addreſſed is now no more; and becauſe ſuch expreſſions of reſentment, whatever circumſtances of provocation might be ſuppoſed to exiſt, have no tendency to elucidate the matter in controverſy. We ſincerely regret that any unfavourable concluſions concerning Dr. CHISHOLM's deſign in his Eſſay, are to be found in that paper of our deceaſed friend; which, we are perſuaded, a more deliberate view of the ſubject would have induced him to expunge. But, while we acknowledge and lament this miſapprehenſion, we muſt maintain, from long and intimate knowledge of the deceaſed, that no motives could be more pure, honourable and benevolent, than thoſe which directed his conduct: and, whatever error has been committed on this occaſion, it muſt be aſcribed to the ardour of his feelings in every thing that concerned the ſlavery of the unhappy Africans, and the pernicious conſequences which his mind attached to the doctrine of the foreign origin of peſtilential fevers.

Dr. CHISHOLM indignantly repels the cenſure paſſed on his conduct; and, in doing this, he manifeſts the warmth of conſcious integrity, and the irritation of offended honour. As it was never our wiſh to criminate the motives of that gentleman, we obſerve, with pleaſure, the explanations offered in his defence. And we think ourſelves authorized thus publicly and explicitly to apply the language of retraction, which our deceaſed friend had pledged himſelf to employ, when he declared, "I ſhall be as ready to withdraw the cenſures that I have paſſed upon him, ſhould he convince me that they are unmerited, as I have been free to advance them; and in a manner equally public."

After this ſtatement, we have too good an opinion of Dr. CHISHOLM's character to doubt his approbation of what we have done.]

SIR, *Fort-Royal, Martinique, Sept.* 6, 1768.

IN the letter accompanying the Medical Repository, which you have been pleased to transmit to me, your intention is stated to be to give me the earliest and best opportunity to justify myself from the imputations that you thought yourself constrained to cast upon me—and you add, that I will readily perceive, that if all your arguments, subsequent to the narrative part, and founded on

* See vol. i. p. 471.

climate, &c. are false, this will avail me nothing, unless Mr. Paiba's story can be decisively contradicted, and proved to be false. Some animadversions having been published by Dr. Trotter, in his *Medicina Nautica*, on the part of my narrative which relates to Capt. Dodd of the Charon, and the consequences to the Charon and Scorpion of having met with the Hankey at St. Jago, it was my intention, in a new edition of the Essay on the Malignant Pestilential Fever, to give such further proofs of the fair and solid grounds on which I have proceeded, as would remove every doubt from reasonable and unprejudiced minds. As this is still my intention, I forbear entering into any minute discussion here. I shall only, in general, observe, that the narrative which I have given, on the authority of Mr. Paiba, is, in the general at least, correctly such as he gave it to me. The information was not communicated in manuscript, as you state yours to have been, but in conversation. This conversation took place, expressly with a view, as I mentioned to Mr. Paiba, to elucidate the cause of the fever which *then* prevailed. Not being able to account for it by any reasoning arising from the consideration of local causes, and having heard it very generally suggested that it proceeded from infection imported by the ship Hankey, I requested a friend, the honourable Samuel Mitchill, Esq. now the senior member of the council of Grenada, to introduce me to Mr. Paiba, in order that this suggestion might be pursued by the communications that gentleman might be pleased to favour me with. Mr. Mitchill brought Mr. Paiba to my house, and was present during the greatest part of the time the conversation continued. I found Mr. Paiba very willing to give me every information in his power relative to the state of the Bulama or Boulam colony, and of the ship Hankey—but I found him strongly disinclined to fall in with the universally received opinion, that that ship introduced the disease. The particulars I have given are those Mr. Paiba related to me in this conversation; and, in order to be correct, I, immediately after Mr. Paiba left me, committed them to paper. Mr. Paiba promised to favour me with a written account; and, in order to direct that gentleman's attention to the points I considered as of most importance, I drew up a set of queries, and Mr. Mitchill charged himself with the delivery of it. A copy of these I have now in my possession, and a slight attention to them will exhibit my view in framing them, and show the doubts respecting the nature of the epidemic which suggested them. Although I repeatedly, through Mr. Mitchill and Mr. Palmer, the gentleman with whom Mr. Paiba resided in the country, renewed my request to have this promise fulfilled, Mr. Paiba left the island without gratifying it. If no other strong proof existed of something peculiar in the fever which at that time prevailed, the cir-

cumstance of my formally applying to Mr. Paiba for information relative to the state of the Hankey, and of taking the trouble to obtain an interview with him, presents an evidence as conclusive as can well be required by reasonable men. But the belief of the infection of the Hankey was universal, nor was it by any means confined to those whose interest might have been affected by the prosperity of an infant colony on the coast of Africa.

I again declare that the Hankey arrived at Grenada on the 18th or 19th of February, and not on the 19th of March, as you state, I suppose, on the authority of Mr. Paiba. The following extract from the St. George's Gazette of the 19th of February, will incontestibly prove this: "By the ship Hankey, of London, "arrived here yesterday from the island of Boulam, on the coast "of Africa, we are informed that she and another vessel carried "out to that settlement upwards of three hundred adventurers, of "whom *one third* had not survived her departure from that settle-"ment; indeed, the mortality raging there is so destructive to "European constitutions, that the ship's company, the short "time she lay there, were actually reduced to less than a third of "her full complement of men.

"Since framing the above, we have it from good authority that, "of the whole number the two ships carried out, only *ten* were "living when she took her departure."

I again declare that the bedding and effects of the deceased were preserved on board the Hankey, and constituted the seminium of the infection. Capt. William Liddle, of the ship General Mathew, saw them on board; and it was in consequence of that gentleman's representation, the lieut. governor, Mr. Home, entered into a strict investigation of the matter; the general result of which I have given, and the authenticity of it may be depended on. Capt. Liddle is now resident in London, and Mr. Byles, the governor's secretary, is now resident commissary at Grenada; and these gentlemen will readily testify to the truth of my statement. The destructive articles I have mentioned were not thrown overboard till the Hankey arrived at Grenville Bay, when they were destroyed at the request of Mr. Prendfoot, the gentleman who chartered the ship to England.

With respect to your arguments founded on climate and marsh effluvia, I have to observe—1. That your information relative to the situation and construction of the town of St. George's is almost altogether unfounded—2. That the carenage is acknowledged to be the most healthy part of the town, and the bay the least so—3. That the marshes you speak of are covered with mangroves, and subject to the ebb and flow of the tide—4. That the tide rises, in general, about a foot, and, at spring tides, to eighteen inches—5. That the mangrove marshes on the S. E. lie too far distant to af-

fect the town, and are separated from it by the Lagoon, a large sheet of salt water, a considerable isthmus of rocky land, and the harbour—6. That the disease first appeared on shore, in the house of Stowe, Wood and Co. gentlemen belonging to the island of Bermudas, and not in Montserrat, or that part of the town inhabited by the lower and most dissolute part of the inhabitants—7. That the inhabitants of that district of St. George's are almost all free people of colour, and among them the disease never appeared affecting their persons—8. That the inhabitants of the bay were more subject to it, if possible, than those of the carenage—9. That many instances, which I could detail, occurred of gentlemen residing on the hill (another and still more healthy district of St. George's) receiving, most evidently, the infection from others labouring under the disease, who had no connection whatever with the shipping, or with any thing commercial—10. That the infection of the disease was carried to Richmond-hill, and there communicated to persons imprudently approaching too near the infected—11. That the inhabitants of the marshy districts of the island, Grenville Bay, Gouyave, and others, were not more sickly than usual during the years of 1793 and 1794—12. That in 1795, when the insurgents drove these people into St. George's, they became remarkably so, and the pestilence acquired a degree of concentration which, under the same phenomena, rendered it most dreadfully destructive—13. That the white attendants and nurses were remarkably subject to the disease, and many of them, as well as of the medical gentlemen of the island and army, perished in it—14. That, the radius of infection never exceeding ten feet, the avoiding its influence was easy; and, consequently, many, residing in even the same house with the infected, escaped it—15. That during the prevalence of the disease, the inhabitants of the country, aware of its pestilential nature, carefully avoided any personal intercourse with the town, and thereby, in most instances during 1793 and 1794, escaped infection—16. That the questions stated by you (p. 490.) have thus their solution, except one, which shall be discussed more fully elsewhere; viz. "What "was there, in so warm and equable a climate, to arrest so sud-"denly and totally a disease of specific contagion?"—17. That the blacks and people of colour not being subject to its action in any remarkable degree, they carried on the intercourse between the town and country with impunity—18. That, notwithstanding these circumstances, fully two thirds of the white inhabitants were infected during the year 1793, and the remainder, as already stated, received the infection in 1795—19. That Mr. Paiba and Capt. Cox's visiting in different houses without communicating the infection is an argument of no moment, as it is incontestible that the seeds of infection were confined to the bedding and clothes

of the deceased—20. That the statement of Mr. Paiba, relative to the case of Capt. Remington, as quoted by you, is not correct, nor founded on fact; that my evidence for what I have advanced is founded on the information of captains of vessels, who knew all the circumstances of his visit to the Hankey, and of Dr. John Stewart, an eminent practitioner, who attended him at Grenville Bay, when he arrived there—21. That the idea of his having returned to Grenville Bay in an open boat is absurd, nothing of the kind having ever been attempted—22. That your illiberal observation on the first case which I have subjoined to the Essay is refuted by your mis-statement of the date of the arrival of the Hankey, and by 20—23. That the omission of the date of this case I am not accountable for, my partner having attended the patient during my indisposition, and having drawn up the case from memory. My view in inserting the case is chiefly to shew how undecided our opinion, and how imperfect our knowledge of the nature of the disease were at that early period.

One circumstance which I advanced on the authority of the late Mr. Home I mean to withdraw. It is the statement of the consequence to the Charon and Scorpion of their interview with the Hankey at St. Jago. I have lately received from a gentleman of the navy here, a log-book of the Charon, kept by one of her officers during the voyage in question. In this I find that no sickness took place in either of these ships in consequence of this interview. A log-book is unquestionable evidence, and I therefore admit it. Why Mr. Home should mention this as a fact communicated to him by Capt. Dodd, I can assign no reason.

Upon the whole, I feel the strongest conviction that the Hankey introduced the infection of the fatal fever which prevailed in Grenada in 1793; a conviction arising from no prejudice in favour of any opinion or theory—from no sinister motives—from no design to furnish arguments against the abolition of the slave-trade.

I shall add a few words on the argument you have affected to deduce from the appearance of a singular fever in the years 1791 and 1792, in the detachment of royal British artillery stationed at Grenada. You wish to torture this into a support of your opinion; but a careful and dispassionate perusal of my paper on that subject will clearly show, that the morbid causes there stated, had not, and could not have any affinity to those of the malignant pestilential fever. The disease was confined to a small spot totally unconnected with, and distant a mile from the town of St. George: it affected only the inhabitants of that spot: and when these (the artillery) were removed from it to a more healthy situation, it altogether ceased. This fever was extremely different indeed from that which appeared in 1793, although a few of the

symptoms bore a slight resemblance. The observation I made to Mr. Paiba, when he had described to me the fever which so fatally prevailed on board the Hankey at Boulam, or Boulama, applied only to the fever of 1791 and 1792—not to the disease which then prevailed at Grenada, or rather in the harbour; for I believe, at that time, the infection had not reached the houses of the town. A resemblance undoubtedly could be perceived between that fever and that described by Mr. Paiba, and it was so remarkable that I took notice of it to him. Any person who attentively and candidly peruses the passages of the Essay which relate to this subject, and who sees things in their true light and form, must observe that I have no where mentioned, far less maintained, that the plague prevailed on board the Hankey—they will perceive that a fever, proceeding originally, perhaps, from the inclemency of the season, and the circumstances of the situation of the adventurers, had become, by confinement, filth, consequent impurity of air, and depression of spirits, a true jail fever, or a fever of infection, heightened to an almost pestilential virulence. Infection, proceeding from a source such as this, and retained and concentrated by the preservation, the pertinacious preservation, of the bedding and clothes of the dead, might certainly have been sufficient to produce the most dreadful effects.

I may here observe, that it was in consequence of a request of Dr. Duncan, of Edinburgh, I first seriously thought of offering to the public an account of the malignant pestilential fever. That gentleman, in a letter dated the 14th of November, 1793, says, "If you have drawn up any account of the late very fatal fever, "which, we are told in the newspapers, was imported from Sierra "Leone, and has, of late, prevailed in Grenada, its being speedily "communicated to the public, by the same channel, (the Medical "Commentaries) will be a singular favour to me, and, I trust, a "real benefit to the public." In compliance with the Doctor's request, I began what I imagined would have been comprized in a paper sufficiently limited for his purpose; but the subject grew upon me, and I, sometime after, informed him that I found it so important as to demand a distinct treatise. This will account for the deficiency of date in the first case, which is made an argument against the purity of my intention in publishing, as well as for no cases prior to the month of June appearing in the collection. A habit of observation I early in life acquired, by committing to paper every circumstance capable of elucidating the diseases which occurred in my practice whilst surgeon to the 71st British regiment, during the late war in North-America; and since, during my residence in the West-Indies, in private and public practice. It is not, therefore, to be supposed, that my observations on the disease in question commenced subsequent to the receipt

of Dr. Duncan's letter. The greatest part of the particulars which have met the public eye were collected, but not arranged, long before; and the account of the origin of the disease was drawn up very soon after my interview with Mr. Paiba.

I shall take leave to offer one remark, whilst on the subject of imported infection, as it relates to New-York: During a considerable part of the years 1776 and 1778, my duty led me very much to reside, for weeks together, in that city; and, during my residence, particularly in the summer and autumn of 1778, which were remarkably hot, and infufferably so, in the lower streets of New-York, no disease of a very alarming nature, and none which assumed the form of an epidemic, appeared among the troops or inhabitants. The smell from all the slips, and from those in particular delineated by Dr. Seaman, was in the highest degree offensive. The police, at that time, was by no means strict: putrid substances of every description were accumulated in the slips, and in many parts of the city unconnected with the wharves, yet no disease was the consequence.

I have the honour to be,

Sir,

Your obedient and humble servant,

C. CHISHOLM, M. D.

Dr. E. H. SMITH.

ARTICLE VIII.

Observations on Soda, the Alkaline Basis of Animal Gall and of Sea-Salt, and the Effects it produces in the Concoction of Food, and in preserving Provisions; in a Letter from Dr. MITCHILL *to* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, dated New-York, Dec.* 23, 1798.

FROM the facts stated in several of my former essays, I think the antiseptic powers of alkaline earths and salts are incontestibly established. These substances seem to have been produced, in the economy of nature, to make a stand against that predominant acidity, which, without their interference, would threaten the animated world with ruin.

But alkaline substances are not only strewed over the face of the earth, to exercise their neutralizing operation there: *soda* exists in the waters of the ocean, combined with muriatic acid, and in the gall of animals, united to an inflammable resin. And both sea-water and bile excite, though in different degrees, a bitter taste.

Many animals that have plenty of gall are greedy of sea-salt. Even wild creatures, in the American woods, can be tempted by it to approach a man who carries salt in his hand. The instinctive appetite for this substance is a very remarkable thing, and is worthy of particular consideration. Sea-salt has been denominated *muriate of soda;* and for the sake of uniformity, and to make the subject a little clearer, I shall, at this time, for want of a better name, and without contending for the propriety of it, call bile, or gall, the *bitter of soda*. It cannot be improper to make an approximation in terms where there exists a strong analogy in nature.

Though the soda which NEWMAN (2 Chem. Works by Lewis, p. 433.) obtained from gall by incineration, might be said to have been produced by the fire, yet the experiments of FORBES, (Essay upon Gravel and Gout, p. 119, 120.) and SAUNDERS (Inquiry into the Properties, &c. of the Bile, Exp. 5 and 6.) if there were no other authorities, put the existence of that alkali, as a native ingredient of healthy bile, entirely out of doubt. It would seem, therefore, that the *bitter of soda*, or the *gall*, should not of itself be prone to corruption, nor to promote putrefaction in other bodies. This fluid does, in fact, resist intestine changes more than most products of animal secretion.

I remember, ever since my childhood, the custom of American husbandmen to save the gall of the beeves they slaughtered

for family use in autumn. A piece of the liver was cut out with the whole gall-bladder, and generally hung up on a neighbouring tree. Perhaps it was carried into the kitchen, and stuck up there, or, perhaps, remained in the tree until the next summer. In either case, whether exposed to culinary warmth or wintry cold, the contents of the cyst underwent no sensible change, saving a thickening by the drying away of its moisture. There was never any putrefaction or sign of taint. The use for which they kept it was for plaisters to put on the feet of their children and labourers when wounded by nails and thorns; and I question whether pharmacy can furnish a better one.

In respect, then, to its uncorruptibleness, the bitter of soda has a near resemblance to the muriate of soda; that is to say, it will remain an indefinite time, in exposure to common atmospheric agents, without undergoing decomposition.

Surely, then, the *acrimony*, the *putridity*, the *causticity*, and the *numberless mischievous qualities* ascribed to bile by modern writers, are not real conditions of that liquid, but notions of their own heads. Far different from such false and fabricated statements is the action of that *natural soap*. Mild, wholesome and incorruptible, the bitter of soda stands ready to check the growth of acidity, to prevent the accumulation and the consequences of nastiness, and limit the progress of the alimentary mass in its tendency to corruption.

If disorders of the alimentary canal are sometimes accompanied with a great flow of the bile, the bitter of soda flows to wash away or neutralize the offending cause in the stomach or duodenum. As a mote in the eye stimulates the lacrymal gland to secern tears, and prevent its injurious effects, so an acid stimulus in in the primæ viæ excites the liver to prepare and send forth a sufficient quantity of the bitter of soda to overcome it. Such is its kind and pleasant operation. Never have I found any thing like an experimental proof of its injurious qualities. Yet the mischievous effects of substances swallowed, and corrupting in the intestines, have generally been ascribed to the bile, which is spoken of with a vehemence and repetition of abuse that hardly any thing could exceed. As well might the nausea and giddiness from a quid of tobacco be ascribed not to the herb, but to the spittle which it stimulated the salivary glands to pour into the mouth. With as much propriety might blisters of the skin be ascribed to the serous fluid effused by the exhalant arteries, and not to the epispastic of cantharides.

Experiments have abundantly shewn, that muriatic acid, poured upon bile, combines with the soda, and constitutes common salt. In these experiments the bitter of the bile is precipitated or set loose. It does not yet appear to be quite settled wherein *bitters* exactly

differ from *astringents*. With respect to their composition, I suspect the difference is rather in *degree* than in *kind*. If so, then, as *astringency* consists in the combination of the gallic acid and the earth of alum, there can be conceived nothing injurious to health in that portion of the secretion of the liver.

If muriate of soda can be thus produced artificially, and *out of the animal body*, there can be no doubt of the possibility of its formation by a natural process *within* the body, where the spirit of salt is taken as an article of food or of medicine. GLAUBER seems first to have practised the extraction of this singular and moderate acid from its alkaline basis in sea-salt, (2 Boerhaave Chem. Proc. cxliii.) and to have given an account of its excellence in diet and domestic economy. BOERHAAVE describes it as "remarkably agreeable to the stomach, promoting appetite, "attenuating mucus, assisting digestion, preventing putrefaction," &c. and concludes the character of this liquid procured from sea-salt by affirming, that "it is above all praise." (Ibid.) And HOFFMAN (Obs. Phy. Chem. lib. 2. Obs. xvii.) speaks of the using of spirit of salt with flesh broths as a common practice. It is rather a pity the oxygenated forms of this acid and their combinations have chiefly attracted the notice of the more modern chemists.

Yet, though the spirit of salt is so safe and valuable a preparation, the untutored appetite of man and other animals has led them to prefer the muriatic acid in conjunction with soda, that is, sea-salt or common salt, to the spirit of salt itself. There must be a reason for this; and this reason, which is founded deep in the nature of things, is worthy to be searched for.

Thus the constitution of many creatures is supplied not only with the *bitter of soda* furnished by the liver, but with the *muriate of soda* taken in with the food. Then the question before me is, What are the chemical effects of the muriate of soda taken into the stomach with the aliment? Now, I say, in creatures who eat substances which contain septon, or the basis of the acid of putrefaction, there may happen cases of surcharge, retention, or indigestion; and, at such times, may be formed within the stomach or intestines a portion of that offspring of corruption, the septic acid, after the same manner as in other putrefactive processes. Besides the agreeable stimulation afforded by the muriate of soda to the palate and stomach, its alkali lies ready to seize and neutralize any little parcel of septic acid that may happen to be produced. After this manner, that injurious acid is taken out of circulation, and the mild and salubrious spirit of salt is extricated in its stead. And, in a similar way, the soda of sea-salt has an operation in the stomach similar to the soda of the gall in the intestines. In the former case the muriatic acid is set loose—in the

latter the bitter principle. In both the soda will quit its present connections, to combine with a stronger acid. In such cases cubic nitre is the new product. Where no acid is generated, there will be no decomposition of either. The reason, then, is apparent, wherefore it is better to take the muriatic acid *with soda* than without. There may be a farther use, that from this source the bile itself may derive its alkali.

The principle whereupon sea-salt acts, in preserving food, may thus be considered as investigated. But it may be asked, why the muriatic acid is so much milder than the septic? To this I reply, that as the unknown radical of that acid attracts oxygene more forcibly than any other known substance, it acts with moderation upon almost every other body; not like the septic, powerfully acting and being itself powerfully acted upon, but, on the contrary, not readily decomposing other bodies, nor being itself readily decomposed. When the base of the muriatic shall become known, certain doubts and difficulties which beset this part of the inquiry will be cleared away, and not until then. This discovery is a grand desideratum in science.

Yet the muriate of soda is not only mingled with food when eaten, but many substances intended for nutriment are sprinkled, pickled, or impregnated with it in the larder and kitchen, before they are served up at table. Sea-salt is preferred for culinary purposes, not because it is the *strongest*, but the most *palatable* and *agreeable* of antiseptics. This may be best understood by shewing what soda can do alone.

If I am not mistaken, the operation of this alkali to overcome the harmful products of putrefaction, is amply supported by the ancient mode of embalming, as practised in Egypt. For HERODOTUS, in describing the process, particularly mentions, among other things, that the bodies WERE SALTED and hid in NITRE for seventy days, (B. ii. cap. 85, 86.) "the use of which was to "dry up all their superfluous and noxious moisture." The Greek historian uses both the word νίτρον and the atticism λίτρον to express the substance used for salting the bodies. Now, it is a settled point, that these words, though translated "nitre," mean not the "salt-petre" of the moderns, but soda, or the basis of sea-salt. This chemical correction, strengthened by the authority of WARBURTON, (3 Divine. Leg. b. 4. § 3.) contending that the body of ISRAEL (Genesis, c. l. 2, 3.) was kept by the embalmers the customary time in nitre, (carbonate of soda) evinces how long ago it was known that the mineral alkali absorbed the septic fluids produced during the corruption of human bodies.

Soda alone then can preserve the flesh of an animal from corruption; and if mere preservation was all that was intended, this alkali would, by itself, answer the purpose; and so would pot-ash.

But there is some quality in the muriatic acid which makes the compound which it forms with soda a far preferable substance to prevent the corruption of meat intended to be eaten.

In order to understand what effect the muriate of soda has, it will be proper to consider what change the piece of meat in the larder was undergoing, which could be arrested by the sea-salt. The flesh of animals (I mean, particularly, the muscular or lean parts) may be considered as verging towards a putrefactive state from the time the fibres lose their irritability, and become rigid. And one of the signs of incipient putrefaction, under circumstances favourable to that process, is sometimes a *sourness* or *production of acidity* in the substance; (4 Fourcroy. Chap. xvi.) and this acidity is inherent in the meat, and quite another thing from fixed air. What I mean is the *septic acid*, which sometimes poisons dissectors, and which, when volatilized into gas, and diffused through the atmosphere, causes violent endemic distempers. When produced, it is formed early in the putrefactive process, and before the whole flesh has undergone total disorganization. But, fortunately for mankind, it is not *always* engendered during the putrefaction, even of those substances which contain its basis, septon. This radical frequently escapes in the form of azotic air, without combining with oxygene at all, and, in such cases, the exact matter of pestilential fluids is not formed.

In cases where the septic acid is formed in salted meat, the muriate of soda is decompounded; and while the alkali attracts the destructive septic acid to itself, it lets go the muriatic. The flesh, in proportion as it becomes impregnated with this new and preserving ingredient, progresses, afterwards, slowly towards decomposition, because it is enveloped with a liquid acting feebly upon it, and upon which it can exert, in its turn, but a feeble action. Hence, when beef, or any other lean meat, is plentifully charged and surrounded with salt, there is enough of soda to neutralize the acid of putrefaction, should any be formed, and there is also a corresponding proportion of the spirit of salt disengaged; from which latter proceeds, in a certain degree, the agreeable smell and pleasant taste of well-salted provisions.

To preserve the flesh of animals, there must, therefore, be not only salt enough in the barrel, but this salt must be applied to every part of the meat, by cutting it into pieces of moderate size, and by rubbing in the salt with a strong hand, as well as by the application of brine or pickle. When too little salt is applied, and provisions are become tainted or corrupt, there is not soda enough to arrest the septic acid, nor a sufficiency of muriatic acid extricated to impregnate and preserve the remainder of the meat. From this septic matter, disengaged with a portion of hydrogene, phosphorus, &c. proceeds the disgusting flavour and sickly nauseating

fœtor of badly-cured provisions. Thus I account for the production of a large proportion of the pestilential air evolved from stinking *beef*, *hides*, and *fish*, which almost depopulated New-York this year. An alkali could have stayed the whole mischief.

Soda may be thus considered not merely as an antiseptic, but as a substance remarkably friendly, and even necessary to the constitution of the more perfect animals, and especially of man. We are now able to judge a little more clearly and consistently concerning the operation of the various preparations of that alkali upon the alimentary canal. The neutral salts, with this basis, are among the most mild and agreeably-efficacious articles of the shops. The *tartrite of soda* (Rochelle salt) is an elegant remedy, and one which I have employed with much satisfaction to keep the intestines free from noxious matter in our pestilential and other fevers. The *phosphate of soda* (soda phosphorata) is, perhaps, a yet more elegant medicine, readily soluble in water, easy to take, and not difficult to be decompounded in the bowels. The *carbonate of soda*, dissolved in water, and taken into the stomach at the rate of from four to eight grains in two or three hours, is a most gentle and efficacious remedy in dysenteries, and in cholera infantum. If tenesmus is violent, clysters of soda often afford almost instant relief. Laudanum, if necessary, may be joined with it in both cases. Indeed, in the three enumerated forms, soda is capable of attracting the septic acid, which, no doubt, is a frequent exciting cause of dysentery. The *sulphate of soda* is the WONDERFUL SALT OF GLAUBER, and familiar to physicians, and indeed to housekeepers: I shall, therefore, only remark upon it, for the information of chemists, that, contrary to the arrangement in the common tables of elective attractions, Mr. CHAPTAL has shewn, (Memoire sur la Decomposition a Froid, &c. 1 Memoires de Chimie, p. 47.) that the nitrous (septous) acid can decompound the vitriolic salts, that is, those saline compositions which contain the sulphuric acid; and he enumerates by name Glauber's salt, or sulphate of soda, as one of the vitriolic salts capable of being thus decompounded. The *muriate of soda* has likewise, of late, been highly extolled as a valuable anti-dysenteric remedy.

But what signifies it to enlarge on the preferableness of this alkali, in medical prescriptions, to either of the other alkalies? The very name it now bears is SODA, a word synonimous with *pyrosis* and *cardialgia*, and signifying that disorder in the stomach called, by the speakers of the English language, "heart-burn." When I first became acquainted with it, the officinal name was *sal sodæ*, or *salt for the heart-burn*. Latterly, the name "soda" has been transferred from the disease to the substance used in curing it; in which it has been so firmly established since its introduction

into chemical nomenclature, that many of the younger class of modern inquirers have to find out, by searching their dictionaries, that soda had ever any other meaning than the one it at present bears. It will appear from these remarks, that soda was, a considerable time since, thought a good thing for the alimentary canal, and the reason of this was what I have attempted to assign and illustrate.

This theory of bile and sea-salt will be called visionary by some, perhaps the greater part of those who peruse it, especially if they glance at it superficially. To this treatment reformers must submit. Their whole employment is like pulling against the tide, and sometimes beating against the wind too. They should remember the words of the poet, and be meek:

> Truths would you teach, or save a sinking land,
> All fear, none aid you, and few understand.

I am glad to find, by your letter to me from Philadelphia of the 18th instant, that you have finished your reply to Dr. PRIESTLEY. I had before learned from him that you had engaged on the antiphlogistic side. For my own part, I have, as yet, found no reason to make me quit the MIDDLE GROUND I have taken. I, however, wait with impatience for the pamphlet containing your experiments; and, in the meantime, beg you to accept of my best good wishes.

ARTICLE IX.

Sketch of the History of the Weather and Diseases at Hartford, in Connecticut, during the Winter and Spring of 1798; *contained in an Extract of a Letter from Dr.* MASON F. COGSWELL *to the late Dr.* E. H. SMITH.

DEAR SIR, *Hartford, June* 7, 1798.

SINCE the last fall, the inhabitants of this place, and around it, have enjoyed a very unusual degree of health; and, indeed, I believe it has been the same over the whole country, at least as far as I have been able to learn. The weather here has been somewhat peculiar. I will endeavour to sketch some of the most prominent features of the season. Our first winter month (December) was uniformly cold, and most of it severely so; and, as the ground was wholly uncovered with snow, the frost penetrated to an unusual depth in the earth, generally from two to three feet. About the beginning of January the weather softened considerably, and continued mild for several days. Most people supposed the *Indian summer* was approaching, (a week or fortnight of warm weather which generally takes place about the middle of January), but, instead of this, there succeeded to these pleasant days a delightful fall of snow, about a foot in depth, which was bound down by an incrustation of hail, and prevented from blowing in heaps by the winds which followed. From this time till about the middle of March, with alternate pleasant and cold weather, we were highly favoured by one fall of snow succeeding another in such a manner as to furnish us with much more fine sleighing than we usually have in one season. The changes in the weather, however, during this period, were uncommonly great and sudden; at the same time they were very frequent. In many instances it changed, in the course of two or three hours, from temperate to the extremest cold. It is worthy of remark, that in the country above us, which is generally full of snow, there was but very little—not half the quantity, at any rate, that we had here and down on the sea coast. We had no rains, and not sufficient warm weather to destroy our sleighing until the latter end of March. We then had several rains, which, with the warmth of the returning sun, during the middle of the day, carried off the most of our snow. The weather still continued cold. Our storms, which were rain here, were snow but a little distance above us. Within thirty miles above us, the snow, which, dur-

ing the winter, had not been more than three or four inches deep, now fell to the depth of between three or four feet, and so on, up the whole course of Connecticut River. Warm weather soon succeeded, and melted the snow, which poured in torrents into the river, and swelled it to an immense size. We have had no flood for almost half a century that equalled it: about forty-five years since there was one which rather exceeded it. The ground was so frozen that it could receive none of the snow as it melted, and the whole of it flowed into the river. The whole of that part of the town east of Market-street was overflowed. Nearly a fortnight I visited my patients in that quarter of the town in a boat, and, in many instances, stepped from my boat into their chamber windows. Several dwelling houses were swept from their foundations, and many of the out-houses were upset, and carried down the stream. This freshet was earlier, by about a fortnight or three weeks, than is usual in the spring. The waters soon subsided from the meadows, but the banks of the river remained full for a long time, by reason of frequent and heavy showers which fell in April; during which time our meadows were mostly planted, and vegetation had considerably advanced. About the beginning of May the rain fell in deluges, more like the West-India rains than those which are common to our climate, and continued until the banks of the river were again overflowed, and the flood rose to a height little inferior to the first. Much more damage was done by it than by the first, as it was sudden, and every body was unprepared for it. The meadows remained covered with the water so long, that in the lowest parts of them every species of vegetation was completely killed; and there has since issued from those vallies an intolerable stench; but the weather, since the subsiding of the waters, has been very fine, and the progress of vegetation uncommonly rapid. It is, probably, owing to this circumstance, and the admixture of the noxious effluvia which were extricated by the heat of the sun, with pure atmospheric air, that they have been hitherto entirely harmless, and I have no doubt they will remain so.

Had a circumstance of this nature happened in the fall, when vegetation was on the decline, and other causes existing which commonly do exist at that season of the year, favourable to the production and propagation of contagion, I have no doubt we should have it in our power to *boast* of as pure a yellow fever as you ever had in New-York or Philadelphia. From the very frequent and sudden changes of the weather, through the whole of the winter and spring, we might reasonably have expected that catarrhal and pneumonic complaints would have been very frequent; but it was far otherwise; they were less prevalent than in ordinary seasons. In November and December we had several

strongly marked pleurisies, which readily yielded to the usual remedies. Sometime in the fall the measles broke out in a family by the water side, which were communicated to them by a transient person; but in no instance was it communicated from them, although the children visited their school as usual until they were taken sick: two other cases existed more than two months after, and at a considerable distance from the other family, both totally separate from each other, without the most distant conjecture from what source they could receive the contagion. From January to the present time the chicken-pox and hooping-cough have been scattered about town in a manner hardly to deserve the appellation of an epidemic, and so mild in their character that they seldom required the aid of a physician. In the months of February and March we had several inflammatory cholics, which terminated in tedious bilious remittents. These, with a few occasional rheumatisms, catarrhal affections, quinsies, glandular swellings around the throat and ears, opthalmies, &c. &c. have constituted the principal complaints which have prevailed here for several months past. In short, the description given by Dr. Rush, in his third vol. of the diseases which prevailed in Philadelphia during the spring preceding the fatal fall of 1793, with a few exceptions, would exactly apply in the present instance: and although we have enjoyed the preceding calm, the terrible tempest, I earnestly hope, will not arrive, or pass by us without injury. I would just remark, that the most characteristic feature in all our complaints, with scarcely an exception, has been inflammatory, and that the depleting remedies, in a greater or less degree, have been necessary for their removal. The bark has almost lost its character with us, there being but a few patients, even in a state of convalescence, who will bear it to advantage. I have prescribed it, in many instances, within a year or two past, where the fever had entirely subsided, and the appetite was beginning to return, when the whole train of unpleasant symptoms immediately returned, and I was obliged to desist from its use. Perhaps, upon Sydenham's revolutionary plan, the season may soon return when a different general diathesis may require a different class of remedies, and this neglected catholicon may assume its former elevated rank in the materia medica.

Most sincerely
I am your friend,

MASON F. COGSWELL.

REVIEW.

ART. I. *Letters from the Health-Office, submitted to the Common Council of the City of New-York.* By *Richard Bayley.* New-York. *Furman.* 8vo. pp. 100. 1798.

THIS is a publication of certain correspondence of the Health-office of the city of New-York, during the years 1796, 1797, and 1798; to which is added, a letter from the Health-officer, dated December 4, 1798, to the Common Council, wherein he endeavours to assign reasons wherefore the pestilential disease of 1798 was more generally prevalent throughout the city than in 1795, 1796, or 1797.

Though this is a local pamphlet, the subjects treated of are of a very general and extensive nature, and peculiarly interesting to the maritime parts of the United States. It exhibits not only an account of the industrious and well-directed labours of the Board of Health, to diminish the causes, frequency and violence of pestilential distempers, but displays a great variety of facts well worthy of public attention, concerning their origin and progress. And what is true of New-York is, under equal circumstances, applicable to any other place.

The correspondence in 1796 contains, in our judgment, evidence enough of *local* causes to excite the distemper in the south-west part of the city that year. These were, "the accumulation "of every species of filth and perishable matter on the low new-"made grounds on the south side of the city, and the abominable "custom of filling up slips and docks with similar materials." For the most interesting pieces of this part of the correspondence, see the first article of our appendix to vol. ii. No. 1.

A considerable part of the correspondence of 1797 relates to the nuisances, in various parts of the city, which the exertions of the preceding year had not been able to remove. The list of spots emitting, occasionally, fœtid and sickly vapours is long and particular. And it is reduced to a certainty, that there is a connection, apparently of cause and effect, between such exhalations and pestilential disorders. The removal, therefore, of such corrupting substances as excite these complaints is an important branch of police in all thickly-settled situations. In the course of this year, experience at the house for the reception of the sick on Bedlow's Island, evinced (p. 67.) the non-contagious nature of yellow fever, and the complete dominion over the exciting causes

of it, in well-situated and well-regulated hospitals. Under such circumstances, the sickness is not communicable by man to man; since nurses, attendants, and friends of the deceased, escape without being infected. Of this, the experiments both on Bedlow's Island and at Bellevue, afford striking proof.

That part of the correspondence which refers to the year 1798 is chiefly directed to the sewers, the county-jail, the side-walks, the slips, lots lower than the level of the streets, water-lots built upon without having been filled up, and paving the streets generally. To all these objects the commissioners have looked with a vigilant eye. Large quantities of putrefying provisions gave them great trouble, and contributed exceedingly to the mass of pestilential air.

We cannot conclude this account better than by inserting an instructive extract from the Health-officer's last letter to the Corporation of the city of New-York:

"In addition to the facts which are contained in the correspondence between the Health Commissioners and the Common Council for the year 1798, I shall offer to your consideration a few remarks upon the origin and progress of the pestilential disease which has lately prevailed in this city; and, in order to corroborate what I may advance, I shall, in the first place, take a retrospect of events which have annually taken place in this city during the warm months since the year 1795.

"According to the records of the Health-office, the yellow fever appeared in 1796 at Whitehall, at the foot of Pine-street, at Burling-slip, and in the neighbourhood of Roosevelt-street Sewer.

"In 1797, between Coenties and the Old-slip, in Front-street, at the Fly-market in several instances, in Fletcher-street, at Burling-slip, in Water-street, adjoining Roosevelt-street sewer, in George-street, and at the foot of Pine-street.

"In 1798 the disease first appeared about midway between Coenties and the Old-slip, in Front-street, between the 1st and 7th of August. On the 7th of August about twenty-three were reported sick to the Health-office. From that period several others sickened, and of the whole number one died. By the 26th of August the complaint had disappeared in that quarter, in consequence of the measures taken to remove the cause, by covering the offensive lots with clean, wholesome earth.

"On the the 12th of August it appeared at No. 283 Water-street, in the case of Mr. Taylor, in an old broken building, on an unfinished lot at the foot of Dover-street, in which eleven persons died early in 1795, and which has since been repeatedly represented as a nuisance.

"August 12th, also, the disease appeared in the case of John Henderson, corner of James-street and Batavia-lane. On all sides

his residence, which was a small crowded building, there were sunken lots in an unfinished state.

" Again, on August 12th, the disease appeared in William Whitlock, cardmaker, No. 51 Cherry-street. In the rear, and to the south of his residence, the lots are very generally below the level of the streets, and without drains.

" August 13th. Murdock M'Lean, Bruce's wharf, was seized, where the disease has regularly made its appearance every warm season since the year 1795.

" The first arrival of sick in this harbour (to the knowledge of the Health-office) from Philadelphia, was on the 13th of August, in the New-York and Philadelphia Packet. The captain died on the passage; the mate was sick, and was sent to Bellevue.

" August 17. Thomas Collard sickened in Banker-street.
18. Nehemiah Fowler John do.
20. Fletcher do.
21. R. Whitmore George do.
22. A. Sharpless, corner of John and Cliff streets.

" From the preceding statement, the yellow fever made its appearance in different parts of the city on the same day; and, in the course of six or eight days, in different streets, remote from one another.

" On the 8th of August, the mercury in Farenheit's thermometer, at an elevation of forty feet above the ground, and in the shade, at two P. M. stood at 91 degrees.

" On the 9th, 96
10th, 90
11th, 89
12th, 86
13th, 83*

" On the morning of the 14th the heaviest rain fell of any time during the year. It began at five A. M. and continued, without intermission, till nine. Numerous cellars, particularly those in the low parts of the city, were filled with water. Lispenard's meadow, which may be considered as within the limits of the city, was entirely overflowed. In six days it had not subsided above ten inches; and the water did not pass off till a large drain was opened for that purpose, by order of the Common Council.

" * The highest to which the mercury rose in July, 1795, was 83 deg.

August,	93
July, 1796,	88
August,	89
July, 1797,	90
August,	82
July, 1798,	94
August,	96

" After the immense fall of rain on the 14th, the thermometer, which had fallen on that day to 78, rose

On the 15th, to	82 degrees.
16th,	85
17th,	90
18th,	90

" The sudden and great increase of heat immediately after the violent rain, appeared to have a proportionate influence in producing fever. Between that period and the 22d of August, upwards of twenty persons in Cliff-street were seized with slight indispositions, which they attributed to sleeping with open windows during the preceding hot and moist weather, but which appeared rather as the forerunner of yellow fever; for not only the persons thus indisposed, but a number of others in the same street, had that disease in the course of a few days.

" From this period the disease became more general; but its fatality was principally felt in Cliff-street and its neighbourhood, at Catharine-slip, in Water-street, and on the unfinished grounds in the southern part of the city.

" Now, having seen that the yellow fever has made its appearance in New-York every year, for several years past, but has prevailed in very different degrees, it becomes a matter of great importance to determine, why the disease was so generally prevalent on the low new-made grounds in this city in 1795, whilst it was scarcely felt in the more elevated situations; why, in 1796 and 1797, its appearance was limitted to particular spots; and why, in 1798, it not only prevailed on all the new-made grounds, but also in parts of the city which had before been exempted from the disease.

" To answer these questions in such manner as to prove satisfactory to every one, might be a very difficult task. I shall, however, offer some reasons which may tend to shew why the fever was more prevalent this year than in the preceding years.

" It is well ascertained, that in the year 1795 there was an unusual degree of heat and moisture in the atmosphere during the warmer months—that the thermometer was considerably higher than in 1796 and 1797, but that in 1798 the heat greatly exceeded that of 1795.

" Now, as heat and moisture are powerful agents in *producing* pestilential diseases, so must the same causes necessarily promote the *extension of* those diseases.

" In the year 1798 there were, besides, local causes of fever in this city, which did not exist in the other seasons, and which, cooperating with the weather, served to extend the disease beyond the limits to which it would probably have been otherwise confined. I have reference to the immense quantities of spoiled beef, fish, and other articles of a perishable nature, which were stored

in different parts of this city. The noxious exhalations arising from these sources, in my apprehension, was a great cause why the disease arose, and raged with great violence, in particular situations. And when we consider the sudden appearance of the fever on Golden-hill and in Cliff-street, and the great number which sickened nearly at the same time, there is great reason to believe this opinion well founded.

"About the 20th of August a report was made to the Health-office, that great quantities of spoiled beef were stored in Pearl-street, between Burling and Beekman slips. The stench which issued from some of the cellars in this situation was so considerable as to prove very offensive to those who passed by, and became a subject of general observation. Letters, in consequence, from the Health-office, were addressed to the owners of provisions in that quarter, enjoining them to have the beef examined, and to have such as was spoiled sent out of the city. Instead, however, of adopting this plan, the beef was brought from the cellars into the street, the barrels opened, and the putrid pickle thrown into the gutters. In some instances the examination was made in the cellars, and the pickle disposed of in the same manner. The gutters which conveyed away this putrid pickle led to Burling-slip sewer.

"The relative situation of this sewer and Cliff-street is such, that the southerly and south-easterly winds force a current of air through the sewer, carrying with it the exhalations arising from the noxious matters collected together in that place, and having a direction to pass more immediately up Golden-hill, and into Cliff-street; and every person in that neighbourhood with whom I have conversed, agrees as to the offensive smell of the air previous to the appearance of the fever.

"On the 20th of August, the wind, which had been blowing from the north and west some days previous, shifted to the south-east, and continued to blow from that quarter for some time. In forty-eight hours after this, there was scarcely a house in Pearl-street, near where the spoiled provisions were stored, in the lower end of John-street, and in Cliff-street, which did not contain sick.

"The sudden appearance of fever in this part of the city, and the great number which were affected in so short a time proves the local nature of the cause; and to the one which I have just mentioned I have no hesitation in ascribing all the effects which were experienced.

"If what we have alledged be admitted sufficient to explain the appearance of fever which took place in Cliff-street, &c. we have made some advances towards accounting for the general prevalence of the disease in 1798.

"But, gentlemen, we have further to remark a particular difference in the warm seasons of 1798 and 1795.

"In 1795 the weather was warm and moist, but there was but very little rain.

"In 1798 the weather was not only much warmer, but was accompanied with sudden and heavy rains.

"Immediately after the rains, the public papers teemed with addresses to the citizens, entreating them to empty their cellars of the water which had collected in them, or the most fatal effects would be felt from neglect or inattention to this circumstance. —It is not my intention to dispute the opinion advanced by these writers. But, if the production of disease was to be apprehended from the lodgment of water in places where the sun's rays never enter, what effects were to be expected from the ponding of water in those numerous lots and yards within this city which are several feet below the level of the streets, containing dead animal and vegetable matters, and to which the rays of the sun have full access? I wish you, gentlemen, to reflect seriously upon this comparison, and believe, that whilst those sunken, undrained lots are suffered to remain in their present state, unless causes cease to produce their effects, diseases must inevitably result."

ART. II. *Medical Inquiries and Observations, &c.* Observations upon the Nature and Cure of the Gout. By *Benjamin Rush, M. D. &c.*

[*Continued from page* 191.]

SO much has been offered to the public concerning the gout, by various authors, and at different times, that, if the actual developement of the disease had kept pace with the exertions made for this purpose, the subject might be now supposed to be nearly exhausted. On the contrary, the unsuccessful treatment of it has been long the reproach of medical imbecility. And whoever can throw any new light on this disease, he will perform an acceptable service to that large and respectable class of society who are subjected to its tortures.

The second part of the volume now before us is devoted to this difficult and important subject.

The author begins his observations upon the gout by delivering the following preliminary propositions: That it is a disease of the whole system—that it is a primary disease only of the solids—that it affects most frequently persons of a sanguineous temperament, sometimes the nervous and phlegmatic, the idle and luxu-

rious rather than the temperate and laborious, and women as often as men, though commonly under feebler forms of morbid action, and not so often in their feet and limbs—that its hereditary quality depends upon the propagation of a similar temperament from father to son—and that it is always induced by general predisposing direct or indirect debility.

The remote causes of the gout which induce this debility, are indolence, great bodily labour, long protracted bodily exercise, intemperance in eating, and in venery, acid aliments and drinks, strong tea and coffee, public and domestic vexation, the violent or long continued exercise of the understanding, imagination and passions, in study, business or pleasure; and, lastly, the use of ardent and fermented liquors. The exciting causes of this disease are frequently a greater degree or a sudden application of the remote and predisposing causes; to which may be added sudden inanition from bleeding, purging, vomiting and fasting; also cold, the debility left by the crisis of a fever, and all these aided by the additional debility induced upon the system by sleep. And the proximate cause is morbid excitement, accompanied with irregular action, or the absence of all action from the force of stimulus.

The author next proceeds to enumerate the symptoms of the gout, as they appear in the ligaments, the blood-vessels, the viscera, the nervous system, the alimentary canal, the lymphatics, the skin and the bones.

The ligaments which connect the bones are the seats of what is called a legitimate or true gout. They are affected with pain, swelling and inflammation. In this respect there is an entire sameness of gout and rheumatism.

In the arterial system the gout produces fever. This fever appears not only in the increased force or frequency of the pulse, but in morbid affections of all the viscera. It puts on all the different grades of fever, from the malignity of the plague to the mildness of a common intermittent.

The gout affects most of the viscera. In the brain it produces head-ach, vertigo, coma, apoplexy and palsy. In the lungs it produces pneumonia vera, notha, asthma, hæmoptysis, pulmonary consumption, and a short hecking cough. In the throat it produces inflammatory angina. It affects the kidneys with inflammation, strangury, diabetes and calculi. But of all the viscera, the liver suffers most from the gout. It produces in it inflammation, suppuration, melæna, schirrus, gall-stones, jaundice, and an habitually increased secretion and excretion of bile.

Sometimes this disease affects the arterial and nervous systems *jointly*, producing in the *brain* coma, vertigo, apoplexy, palsy, loss of memory, and madness; and, in the *nerves*, hysteria, hypochondriasis, and syncope. Sometimes it affects the brain and

nerves exclusively, without producing the least morbid action in the blood-vessels. The muscles are sometimes affected with spasm, with general and partial convulsions, and, lastly, with great pain. The angina pectoris, or a sudden inability to breathe after climbing a hill, or a pair of stairs, and after a long walk has been known to be a sympton of this disease.

The gout affects the alimentary canal from the stomach to the rectum. Flatulency, sickness, indigestion, pain, or vomiting, usually usher in a fit of the disease. Sick head-ach and dyspepsia are often the effects of this disease, concentrated in the stomach. The author asserts he has seen a case in which the gout, by retreating to this viscus, produced the same burning sensation which is felt in the yellow fever. The patient who was the subject of this symptom died two days afterwards with a black vomiting. Cholic, dysentery, diarrhœa, piles, and a troublesome itching in the anus, are often produced by this disease.

This disease also affects the glands and lymphatics. It has been known to produce a ptyalism and a bubo in the groin. The scrophula, and all the various forms of dropsy, have been observed as the effects of its disposition to attack the lymphatic system.

Cases of the gout affecting the skin have been often recorded. Erysipelas, gangrene, and petechiæ, are the acute—tetters and running sores the usual chronic forms in which it invades this part.

Even the bones are not exempted from the ravages of the gout. The bones of the hands and feet have been sometimes dislocated by it; and one instance occurred of its dislocating the thigh bone.

In the next place the author proceeds to treat of the method of cure. The remedies for the gout naturally divide themselves into the following heads: 1. Such as are proper in its approaching or forming state: 2. Such as are proper in *violent* morbid actions in the blood-vessels and viscera: 3. Such as are proper in a *feeble* morbid action in the same parts of the body: 4. Such as are proper to relieve certain local symptoms not accompanied by general morbid action: and, 5. Such as are proper to prevent its recurrence, or to eradicate it from the system.

1. The symptoms of an approaching fit of the gout are languor, dulness, doziness, giddiness, wakefulness, or sleep disturbed by vivid dreams, a dryness, and sometimes a coldness, numbness, and prickling in the feet and legs, occasional chills, acidity and flatulency in the stomach, with an increased, a weak or a defective appetite. During the existence of these symptoms, the disease may be easily prevented by the loss of a few ounces of blood, or by a gentle dose of physic, and afterwards by bathing the feet in warm water, by a few drops of the spirit of hartshorn, a draught of wine-

whey, or a dose of an opiate. To these remedies, it is conceived, an emetic might be very properly added, as the affection of the stomach is so steadily observed at the approach of the disease, and as the analogy of fever would strictly warrant the practice.

2. Among the remedies proper in cases of great morbid action in the blood-vessels and viscera, our author chiefly relies upon blood-letting. He combats, with decisive force, the objections to this remedy, urged on the ground of the gout being a disease of debility, and that bleeding disposes to more frequent returns of it. He states the advantages of it to be the removal or lessening of pain—the preventing of congestion and effusion in the more important viscera—the preventing of the premature wearing out of the system and the shortening of the duration of the fit. Among the remedies of this head he also enumerates cathartics, emetics, nitre, cool or cold air, and sometimes cold water applied to the inflamed part, the antiphlogistic regimen with respect to diet, blisters, and the operation of fear and terror. Cautions are suggested with respect to the use of sweating, opium, and several local applications. Blisters and caustics, applied to the part affected, are much commended. Molasses, applied to the inflamed or painful limb, is much commended. The early exercise of the lower limbs, by walking, is also particularly enjoined.

3. The author next enumerates the remedies proper in that state of the gout in which a *feeble* morbid action takes place in the blood-vessels and viscera. They are opium, Madeira or sherry wine, porter, ardent spirits in the form of grog or toddy, æther, volatile alkali, aromatics, oil of amber, Peruvian bark, the warm bath, mercury given to the extent of ptyalism, and the local application of frictions with brandy and volatile liniment, blisters and stimulating cataplasms.

4. The local symptoms of the gout are directed to be treated upon the common principles which are to be found in practical books.

5. The means of preventing the return of that state of the disease which is accompanied with violent action, are temperance, moderate labour and exercise, the avoiding of cold, moderation in the exercise of the understanding and passions, moderation in venereal indulgences, the avoiding of costiveness, and a stricter abstinence, as well as an attention to occasional evacuations by bleeding, &c. in the spring and autumn.

In the last place the author mentions the remedies proper to obviate a return of that state of gout which is attended by a *feeble* morbid action in the blood-vessels and viscera. These are a gently stimulating diet, the use of chalybeate medicines, the volatile tincture of guiacum, the uniform application of warmth, the warm bath in winter, and the temperate or cold bath in summer,

exercise, the avoiding of costiveness, the constant and agreeable employment of the understanding and passions, but without fatigue of body or mind, and, lastly, migration to a warmer climate.

We have thus delivered an outline of this valuable practical performance; in which the learned author has exploded much pernicious error, and introduced, illustrated, and forcibly enjoined, a great deal of important truth. The perusal, however, of the work itself will afford a gratification which no reader can expect from this naked and imperfect sketch.

The doctrine of the secondary nature of the gout, when it affects the extremities under an inflammatory form, does not seem to be recognized by our author. The primary affection of the stomach or the liver, and its appendages, appears to be strongly supported by many phenomena which usher in the disease. And it is conceived, that the admission of this principle, so far from opposing, would serve greatly to fortify and illustrate many important positions in this treatise.

(To be continued.)

ART. III. *Memoirs of the Yellow Fever, which appeared in Philadelphia, and other Parts of the United States of America, in the Summer and Autumn of the present Year,* (1798.) *&c.* By *William Currie, S. C. M. P. &c.* Philadelphia. *Dobson.* 8vo. pp. 145.

THE author of this piece is the same whose Observations on Bilious Fevers were reviewed in Art. iii. of the first number of the present volume. Our readers will recollect there were several points in that performance, on which we differed from this gentleman. And we really hoped, by this time, the recent experience of the city in which he dwells might have wrought that conversion which the forcible and manly reasoning of Mr. Webster could not effect.

Mr. Jones, the President of the Board of Health, informs the Governor of the State of Pennsylvania, that the "law in respect "to quarantine has been construed and executed in the strictest "sense," and "those objects which have been pointed to with "the greatest confidence as the foreign source of the disease, on "investigation, afford no such proof:" and Dr. Physick, President of the Academy of Medicine, certifies that the distemper broke out and destroyed several persons before the West-India vessels arrived: and yet, notwithstanding all this, Dr. Currie declares and insists the distemper was imported into Philadelphia, and propagated by contagion! Amidst such contradictory testimony, the

impartial public cannot hesitate in determining to which side the weight of evidence inclines.

The work before us is a sort of diary, consisting chiefly of the ordinary observations on the weather, and paragraphs and other pieces from the newspapers. Of such a medley it is difficult to make either abstract or analysis. This, however, is not matter of much regret, as our readers will judge from the following declaration of Dr. Currie, concerning the distemper, *the contagious nature of which*, says he, p. 130. *is acknowledged by all, excepting a few persons that are distinguished for nothing but the singularity of their opinions, and a pertinacious adherence to a tenet which, both by the illustrations of reasoning, and the common sense of their fellow-citizens, has been declared absurd and untenable.* And who are these few? The great body of the inhabitants of New-York, New-London, Providence, and Boston, among whom no dispute exists about the production of its exciting cause in their respective places, from substances before their eyes. It afflicts us to observe such groundless assertions repeated, from year to year, by the publisher of these memoirs. It would become him to remember that other persons possess reasoning powers and understanding as well as himself. He should be more liberal and charitable. Dr. Currie has not, that we know, engrossed or monopolized all the medical knowledge and sagacity of America. Unmannerly expressions are not calculated to gain him proselytes.

Concerning its contagious quality, we recommend to Dr. Currie the following fact: Seven men, belonging to the Alms-house of the City of New-York, were employed, during the whole of the sickly season of 1798, in putting the persons dead of the plague into coffins, and, in the course of their service, they handled upwards of five hundred corpses, in different stages of putrefaction. Although these men were much incommoded by the pestilential quality of the air in the rooms they entered, and frequently were obliged to vomit, not one of them was so much indisposed during the whole season as to discontinue his employment. And neither in the state hospital, nor city hospital of New-York, did the disease shew any contagious quality.

We should offer nothing more on this extraordinary production, did we not deem it our duty to bear witness against several other dogmas of the author.

To support his notion of contagion, he has recourse to a vitiated secretion; and affirms, p. 106. that "the excretions occa-"sion a similar fever when taken into the body." We do not know how the secretions of Dr. Currie's patients went on; but we can assure him that exhalations from corrupting beef and fish have excited sickness in New-York as malignant and deadly as any which has occurred, and deriving no peculiar qualities, that

we believe, from the vascular action of the bullock or the herring. As far as we can discern, there is no evidence of such morbid secretion, but the pestilential matter appears to be formed, in every instance, *after secretion*, and by a process truly chemical, and wholly independent of animated motion or vital energy. And we would submit to him, whether the difference between *common* and *specific* contagion does not consist herein, that the former is produced *without*, the latter *by*, secretion?

The author passes a stricture (ibid.) upon Dr. Mitchill's theory of pestilence, and seems to think he has explained it away. Dr. Currie, when he affirms that the corrupting flesh of animals emits sulphurated hydrogenous gas and azotic air, affirms what *often* happens. But this does not *always* take place. Nor, if it did, has Dr. Currie mentioned *all* the fluids formed during the putrefactive process. If he intended to be correct, why did he not mention the *carbonic* and *septic* acids, two of the most common results of animal disorganization in hot weather? We have yet to learn, that the production of sulphurated, and, we will add, phosphorated and carbonated hydrogene air, is incompatible with the union of a portion of the septon (azote) of a putrefying carcase with certain proportions of oxygene and caloric. We are surprized that the author should prostitute the word "demonstrate" as he does. Before he publishes criticisms again, we recommend to him a better acquaintance with the subject.

The zeal and industry of Dr. Currie to prove the disease imported into Philadelphia this year, are fruitlessly employed, for the above-mentioned reasons: in addition to which we can inform him, that the story of its introduction into New-Haven in 1794, from the West-Indies, is wholly refuted and done away, as he may see in the report of the committee of the Medical Society of New-York, appointed to inquire into the origin, cause and prevention of their annual endemic distempers. The same, we have reason to think, would be true of all the other pretended instances of importation and contagion, if minutely inquired into.

Dr. Currie's manner of expression puts us in mind of Lord PETER's way of reasoning with MARTIN and JACK, in the *Tale of a Tub*. But we forbear to enlarge, as we think it time to dismiss from further consideration, a performance which has little to recommend it, either of the disentangling and careful spirit of investigation, or the mild and dignified temper of philosophy.

ART. IV. *Transactions of the Society instituted in the State of New-York, for the Promotion of Agriculture, Arts and Manufactures.* Part iii. Albany. *Loring Andrews.* 1798. 4to. pp. 130.

EVERY friend of our country will be gratified to observe the evidence which this publication exhibits of the attention of this society to the important objects for which it was instituted. It is known to all how deeply the prosperity and independence of the United States are concerned in the improvement of agriculture, arts and manufactures. And we flatter ourselves that this institution, composed of some of our most distinguished citizens, and enjoying the patronage and assistance of the government, will vigorously persevere in the present course of exertion, which is equally reputable to itself and honourable to the State.

This work contains a variety of communications, which we shall briefly notice in order.

Article 1. Address delivered before the society at New-York, on the 8th of November, 1796. By James Kent, LL. D.

A considerable part of this animated and elegant discourse is employed in exhibiting the great extent and variety of natural advantages, possessed by the State of New-York, for improving agriculture, arts and manufactures, and, consequently, the wealth and prosperity of its citizens. The felicities of the civil and political condition of the people, as conducive to all the objects of public good, are pourtrayed in a strain of warm and enlightened patriotism. The numerous improvements, of different kinds, which have been accomplished in the United States, and more particularly in the State of New-York, since the æra of the revolutionary war, are rapidly sketched. The example of some of the best cultivated parts of Europe is held up, in several particulars, as a model of imitation, and their population, opulence and resources, stated as incitements to similar exertions in this country. And, finally, a number of interesting objects and plans of improvement are forcibly and eloquently recommended to public attention.

Art. 2. Address to the society, delivered at the city of Albany, on the 7th of February, 1798. By Samuel L. Mitchill.

In this discourse Professor Mitchill presents a cursory view of the transactions under the direction and authority of the society since the preceding meeting. He traces the progress of discovery and scientific arrangement on the subject of manures; and he explains the production of those aërial fluids, which, according to circumstances, operate either as poisons or manures. Upon the principles thus laid down, he demonstrates an intimate and important connection between meteorology, farming and medicine.

Art. 3. Experiments and observations on the culture of white thorn for hedges. By Jonathan N. Havens, Esq.

Among all the various kinds of trees which have been used or thought of for a hedge, Mr. Havens thinks none has been more generally approved of than the white thorn, or hawthorn, as it has been usually termed by the writers on agriculture.

There are three species of the white thorn growing in this country; two of these are native, and the other is believed to have been imported from Great-Britain. Mr. Havens distinguishes the two American species by the names of the *broad-leafed* and the *narrow-leafed*, of which he considers the latter as preferable to all others.

Great difficulty is supposed to attend the propagation of the white thorn. After some experiments, Mr. Havens is of opinion that it may be propagated by gathering the haws as soon as they become ripe in the autumn, and burying them in the ground, below the frost, letting them remain there until the second spring after being buried, then taking them up, and planting them in a nursery. He thinks the haws should be placed in a wet situation.

Art. 4. Observations on manures. By Ezra L'Hommedieu.

In this paper the author treats of the use of fish as a manure—of the manure to be procured by preparing a hole of proper extent and depth, behind the kitchens of farm-houses, to be filled with turf or dirt, and to serve as the receptacle of all the offals and filth from the house, &c.—of the manure procured by annually removing and replacing the loose earth under stables, cow-houses, barns, &c.—of the manure procured by burning peat or turf on the soil—of the manure formed from burnt clay—of the substitute for manure in a careful and minute pulverization of the soil by repeated harrowing—of the best method of obtaining manure by yarding cattle, &c.—and of the advantages of manuring fruit trees by fish, &c.

Art. 5. On the feeding of hogs to advantage. By the same.

The author supposes a saving of one tenth part may be made in the feeding of hogs, by soaking the corn used for this purpose; and he asserts that the same preparation will equally improve that article when intended as a food for horses.

Art. 6. On septon (azote) and its compounds, as they operate on plants as food, and on animals as poison: intended as a supplement to Mr. Kirwan's pamphlet on manures. In a letter to the Rev. Dr. Henry Muhlenberg, of Lancaster, Pennsylvania, from Mr. Mitchill, of New-York, dated October 24, 1796. See Med. Repos. vol. ii. p. 240.

Art. 7. Affinities and relations of septic (nitric) or pestilential fluids to other bodies. In a letter from Dr. Mitchill, F. R. S. E. &c. to Sir John Sinclair, Bart. &c. See the appendix of this number.

Art. 8. On the method of tarring seed corn, to prevent its being destroyed when planted. By James G. Graham, Esq.

The title of this useful paper will sufficiently unfold its object, which is a matter of real importance.

Art. 9. An account of extraordinary crops of corn raised by means of street manure. In a letter from Dr. Mitchill to Mr. Webster. See Med. Repos. vol. i. p. 416.

Art. 10. Method of procuring new varieties of potatoes. By Simeon De Witt.

In this paper is stated the mode of raising potatoes from the seed of what is called the seed-apple, in order to recover them from degeneracy, and to form new varieties. The circumstances of management are ascertained by actual experiment.

Art. 11. On raising potatoes. By Noah Webster, jun. Esq.

Several important directions concerning the management of this inestimable article of food, are briefly and judiciously suggested in this paper.

Art. 12. On the cultivation of the poppy-plant, and the method of procuring opium, &c. By Dr. Shadrach Ricketson. See Med. Repos. vol. i. p. 420.

Art. 13. On the weaning of calves. By Lemuel Clift, Esq.

This is a good economical paper, and interesting to all who keep dairies.

Art. 14. A memoir on the Onondaga salt springs and salt manufactories in the State of New-York. By Benjamin De Witt, M. D.

This memoir is introduced by general observations on the importance of those springs, as an object of natural history, as an object of chemistry, considered in a medical point of view, in a political point of view, and as an object of manufacture.

An accurate description next follows of the situation and general appearances of these salt springs, together with a notice of all the adjacent circumstances, which deserve attention.

The nature and qualities of the water form an important part of this memoir. From half a pint of this water he obtained 551 grains, or about $1\frac{1}{4}$ oz. avoirdupoise, of salt, and 26 grains of calcareous earth (lime); equal to 8816 grains, or 20 oz. and 76 grains of salt to the gallon, and 416 grains, or nearly one oz. of calcareous earth. It contains also a very minute portion of vitriolic (sulphuric) acid, probably united with the fossil alkali, in the form of Glauber's salt, (sulphate of soda.) Hence it appears that the water of these springs holds in solution more than $\frac{1}{6}$th of its weight of salt; whereas sea-water usually contains no more than $\frac{1}{30}$th.

Dr. De Witt's table for ascertaining the quantity of impregnation of all salt waters, merely by comparing their specific gravities

with the known specific gravity of water holding in solution definite proportions of common salt, is very convenient, very judiciously devised, and so far as we recollect, entirely new.

An explicit account of the mode of conducting the salt manufactories next follows; and some ingenious improvements are suggested.

Dr. De Witt calculates, that with the number of kettles now in use at these springs, 70,000 bushels of salt may be annually manufactured.

This memoir contains so much important information, and is drawn up with so much ability and discernment, that we cannot withhold this expression of our warmest approbation.

Art. 15. Result of thermometrical observations for the years 1795 and 1796, made at the city of Albany. By Simeon De Witt.

The observations of which this table is the result, were made from the state of the thermometer at its two extremes within each twenty-four hours. The author properly observes that it is only in this manner that the true mean of the weather can be obtained.

Art. 16. Result of thermometrical observations for the year 1797, made at the city of New-York. By Gardiner Baker. See Med. Repository.

Art. 17. Thermometrical observations made on the North-Western Lakes, from August 4th to Sept. 4th, 1797. By Major C. Swan, paymaster to the Western Army. See Med. Repository, vol. i. p. 526.

METEOROLOGICAL OBSERVATIONS *for October*, 1798, *made in the Cupola of the Exchange, in the City of* New-York.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	51	67	S W	S	2		29 90	29 91
2	63	69		S	1	1	29 98	30 3
3	58	74		S	1	1	30 0	29 92
4	58	72		S	1	1	29 97	29 89
5	57	71	N	N E	2		29 70	29 69
6	61	71	N E	N E		2	29 66	29 58
7	60	59	N E	N E		2	29 50	29 40
8	55	59	N E	N		2	29 37	29 39
9	54	70	N W	N W	2		29 61	29 69
10	59	71		S W		2	29 78	29 80
11	59	68	N E	S W	1	1	29 80	29 87
12	57	62	E	E		2	30 2	30 5
13	47	58	N	N		2	30 12	30 12
14	50	59	N E	N E		2	30 10	30 4
15	48	64	N E	N E	2		29 95	29 90
16	50	66	N W	S W	2		29 84	29 80
17	56	71	N	E	2		29 67	29 75
18	56	76	E	E	2		29 79	29 81
19	51	56	N E	N E		2	29 90	29 88
20	50	57	N E	N E		2	29 80	29 71
21	53	70	N W	N	1	1	29 51	29 45
22	55	70		S	2		29 49	29 45
23	64	64	S W	N W		2	29 20	29 13
24	50	59	N W	N W	2		29 48	29 60
25	50	65	N W		2		29 61	29 60
26	56	72	N W	S W	2		29 58	29 50
27	60	60	S	N W		2	29 55	29 54
28	50	56		S W		2	29 40	29 33
29	36	44	W	W	2		29 55	29 55
30	29	38	W	W	2		29 50	29 34
31	34	40	W	N W	1	1	29 20	29 34

Results of Meteorological Observations for October, 1798.

Mean temperature of the air at sun-rise,	deg. 52½
Do. do. of the do. at 2 P. M.	63
Do. do. of the do. for the whole month,	57
Greatest monthly range between the 18th and 30th,	47
Do. do. in 24 hours, on the 15th,	16

Coldest day the 30th. Warmest day the 9th.

METEOROLOGICAL OBSERVATIONS *for November*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	32	35	W	S W	1	1	29 61	29 59
2	32	42	N	N E	1	1	29 35	29 40
3	37	40	N	N W		2	29 44	29 39
4	31	42	W	N W	1	1	29 52	29 51
5	30	37	W	N W	2		29 59	29 70
6	32	48	W	W	2		29 81	29 81
7	32	50	N	var.	2		30 0	30 0
8	36	52	W	W	1	1	29 98	29 88
9	38	53	S W	S W	2		29 72	29 66
10	30	36	N W	N W	2		29 87	29 96
11	30	52	S W	S W	2		30 7	29 89
12	41	47	S W	S W	2		29 15	29 87
13	30	47	S W	S W	2		30 10	29 95
14	42	50	W	var.		2	29 80	29 78
15	50	57	S W	S W		2	29 47	29 29
16	50	56	W	N W			29 31	29 40
17	36	37	N E	E	2		29 75	29 70
18	39	54	N E	var.		2	29 56	29 57
19	42	40	N E	N E		2	29 57	29 46
20	28	27	N	N		2	29 34	29 20
21	22	28	N W	N W	1	1	29 2	29 10
22	26	38	W	S W	2		29 40	29 46
23	28	34	N E	N	2		29 40	29 40
24	27	36	N W	W	2		29 56	29 58
25	26	30	N E	N	2		29 92	30 5
26	26	42	N E	S	2		30 15	30 13
27	33	46	S W	S W	2		30 6	30 0
28	33	47	S W	S W	2		29 83	29 70
29	40	45	S W	W	1	1	29 51	29 50
30	32	47	S W	S W	2		29 50	29 44

Results of Meteorological Observations for November, 1798.

November 17th, ſome diſtant lightning in the evening. On the 18th, ſmoky air, mixed with electric clouds. At night, much thunder and lightning, with heavy ſhowers. On the 19th, ſome thunder, with thick fog at times, and very dark: the wind ſhifting to the north about 10 o'clock, ſuddenly grew cold, and blew a gale all night, attended with ſnow. The gale abated much in the morning of the 20th, but continued to ſnow all day, until near eleven at night; in which time not leſs than eighteen inches of ſnow fell.

METEOROLOGICAL OBSERVATIONS *for December*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	Thermom. observed at 2 P. M.	Prevail. winds. S. r.	Prevail. winds. 2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	Barometer observed at 2 P. M.
1	36	47	N W	W		2	29 52	29 51
2	32	36	E	E		2	29 60	29 50
3	32	42	S W	S W		1	29 21	29 12
4	39	38	W	N W	2		28 94	29 30
5	17	20	N W	W	2		29 54	29 65
6	19	25	S W	S W		2	29 78	29 57
7	20	31	S W		2		29 80	29 80
8	29	35				2	29 70	29 57
9	27	24	N E	N E		2	29 64	29 52
10	14	22	N W	N W	2		29 61	29 62
11	15	22	E	W		2	29 62	29 54
12	15	27	N W	var.	2		29 82	29 80
13	20	36	var.	E	1	1	29 70	29 57
14	37	38	N W	N W	2		29 30	29 58
15	32	28	N W	N W	2		29 70	29 72
16	15	20	N W	N W	2		29 70	29 68
17	20	26	N W	N W	2		29 76	29 80
18	22	32	N W	S W	2		29 67	29 66
19	26	25	N E	N E		2	29 40	29 26
20	22	24	N	N W	2		29 50	29 50
21	17	28	W	N W	2		29 75	29 79
22	21	24	N E	N E		2	29 76	29 64
23	23	25	N	N W	1	1	29 33	29 34
24	24	28	N W	N W	2		29 47	29 50
25	28	29	W	W	2		29 98	30 1
26	33	34	W	W	2		30 10	29 98
27	34	38	W	W	1	1	29 58	29 50
28	28	36	W	W	2		29 56	29 70
29	32	38	N E	N E		2	29 73	29 79
30	30	24	N W	N W	2		29 80	29 81
31	28	36	N W	N W	2		29 83	29 83

A RETURN *of Patients admitted to the Care of the New-York City Dispensary, from the* 1*st of October*, 1798, *to the* 1*st of January*, 1799.

OCTOBER.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed, &c.	Result.	
Indigestion	1	1				Admitted	55
Bilious Fever	39	34		2	3 Bellev.		—
Dysentery	2	2				Cured	47
Pain of the Stomach	1	1				Died	2
Pleurisy	1	1				Bellevue	3
Hæmorrhage	1	1				Hospital	1
Eruption	2	2				Under care	2
Ulcer	1	1					—55
Tumefied Breasts	1				1 und. c.		
Typhomania	1				1 Hospi.		
Catarrh	1	1					
Luxation	1	1					
Obstructed Menses	1	1					
Worms	1	1					
Rheumatism	1				1 und. c.		

NOVEMBER.

Indigestion	4	4				Admitted	56
Rheumatism	6	6					—
Parturition	2	2				Cured	52
Sore Legs	2	1	1			Relieved	2
Bilious Fever	17	17				Hospital	1
Dropsy	3	3				Alms-H.	1
Asthma	2	2					—56
Contusion	1	1					
Convulsion	2	2					
Luxation	1				1 Hospi.		
Diarrhœa	2	2					
Worms	1	1					
Head-ach	2	2					
Mania	1				1 Alms-h		
Pneumony	2	2					
Fracture	1	1					
Erysipelas	1	1					
Catarrh	1	1					
Scald Head	1	1					
Dysury	1		1				
Abscess	1	1					
Epistaxis	1	1					
Wound	1	1					

DECEMBER.

DISEASES.	No.	Cured.	Relieved.	Died.	Removed, &c.	Result.	
Catarrh	1	1				Admitted	35
Palsy	1	1					
Rheumatism	3	3				Cured	30
Burns	2	1			1 und. c.	Relieved	1
Inflammation of Liver	1	1				Died	2
Luxation	1	1				Under care	2
Contusion	3	3					—35
Pneumony	4	4					
Sore Eyes	1	1					
Indigestion	1	1					
Quinzy	1	1					
Pulmonary Consumption	2		1	1			
Calculus	1				1 und. c.		
Whites	1	1					
Diarrhœa	1	1					
Venereal Disease	5	5					
Inflammation of Intestines	1			1			
Nervous Fever	1	1					
Parturition	1	1					
Sore Legs	1	1					
Worm Fever	1	1					
Chronic Cough	1	1					

SUMMARY.

Whole number of Patients admitted into the New-York City Dispensary, from the 1st of October, 1798, to the 1st of January, 1799, 146

Of this number have been *cured*,	129
relieved,	3
have *died*,	4
Removed to the Hospital,	2
Alms-House,	1
to Bellevue,	3
Remaining under care,	4
	146

HUGH M'LEAN.

A TABLE *exhibiting the number of Patients received into the New-York Hospital in each Month—their Diseases, and the event of each Case.*

July, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Diſ. diſ. and cloped.	Under Care.
MEDICAL.						
Rheumatism	4	4	5			3
Syphilis	15	7	9		1	12
Pneumonia	5		2	1		2
Mania	9	1	2			8
Ascites		1			1	
Gonorrhœa		1				1
Catarrh		1				1
Diarrhœa	1	1	2			
Hysteria	1					1
Typhus Icteroid.		1				1
Typhus Mitt.		1				1
Physconia Splen.	1					1
Scrophula	1					1
Febris Intermit.	1	4	3			2
Erysipelas	1					1
SURGICAL.						
Sore Legs	14	6	4		1	15
Syphilis	11	1	5			7
Frozen Limbs	5		3			2
White Swelling	1					1
Burns	1					1
Cataract	1		1			
Fracture	2			1		1
Tumor	3	1	2			2
Opthalmia	3	1	1			3
Fistula	1	1				2
Contusion	2		1			1
Hydrocele	1		1			
Disordered Spine	1					1
Sphacelus		1				1
Wounds		4			2	2
Cancerous Breast		1				1

Result for July, 1798.

Remaining from last month,		85
Received this month,		38
		123
Cured,		41
Died,		2
Discharged disorderly,		5
Under care,		75
		123

August, 1798.

DISEASES. MEDICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Diſ. diſ. and eloped.	Under Care.
Rheumatism	3	2	2	1			2
Syphilis	12	18	7			1	22
Pneumonia	2		1	1			
Mania	8	1					9
Gonorrhœa	1		1				
Catarrh	1	2	1	1			1
Diarrhœa		2		1			1
Hysteria	1						1
Typhus Icteroid.	1	7	1		3		4
Typhus Mitior	1		1				
Physconia Splen.	1						1
Scrophula	1						1
Febris Intermit.	2	1	1				2
Erysipelas	1			1			
Fistula	1						1
Dropsy		1					1
Opthalmia		2					2
Hepatitis		1			1		
Dysentery		8	1		1		6
Phthisis Pulmona.		1					1
Debility		1	1				
Cholera		1				1	
Paralysis		1		1			
Sore Breast		1	1				
Contusion		1	1				

August continued.

DISEASES. SURGICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Under Care.
Sore Legs	15	8	5	1		17
Syphilis	7	4	2			9
Frozen Limbs	2	1				3
White Swelling	1					1
Burns	1					1
Fracture	1	2	1		1	1
Tumor	2		1			1
Opthalmia	3	1			1	3
Fistula	2		1	1		
Contusion	1		1			
Disordered Spine	1					1
Schirrus	1		1			
Wounds	2	2	2	1		1
Cancerous Breast	1					1
Hernia		1				1

Result for August, 1798.

Remaining from last month,		76
Received this month,		70
		146
Cured,		33
Relieved,		9
Died,		7
Discharged disorderly,		2
Under care,		95
		146

September, 1798.

DISEASES. MEDICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Under Care.
Rheumatism	2	3			5
Syphilis	22		9		13
Pneumonia		2	2		
Mania	9	1	3		7
Gonorrhœa		1	1		
Catarrh	1	1	1		1
Diarrhœa	1	5	1		5
Hysteria	1		1		
Typhus Icteroid.	4	18	10		12
Physconia Splen.	1			1	

September continued.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Remov. to the Alms-H.	Diſ. diſ. and eloped.	Under Care.
MEDICAL.							
Scrophula	1		1				
Febris Intermit.	2	1	1				2
Fiſtula	1	1	2				
Dropsy	1			1			
Opthalmia	2		2				
Dyſentery	6		6				
Phthiſis Pulmona.	1			1			
SURGICAL.							
Sore Legs	17	6	10		2	4	7
Syphilis	9	5	7			2	5
Frozen Limbs	3		1		1		1
White Swelling	1			1			
Burns	1		1				
Fracture	1	2	3				
Opthalmia	3		2				1
Diſordered Spine	1			1			
Wounds	1		1				
Cancerous Breaſt	1		1				
Hernia	1			1			

Result for September, 1798.

Remaining from laſt month,	94	
Received this month,	47	
		141
Cured,	66	
Died,	6	
Removed to the Alms-Houſe,	3	
Eloped,	6	
Under care,	60	141

SUMMARY

For July, Auguſt, and September, 1798.

Patients remaining under care at the end of the quarter terminating June 30,	88	
Patients received in the laſt three months,	155	
		243
Of theſe have been cured,	144	
relieved,	9	
died,	15	
been removed to the Alms-Houſe,	3	
diſcharged diſorderly and eloped,	13	
There remain under care, October 1,	59	
		243

October, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Diſ. diſ. and eloped.	Under Care.
MEDICAL.							
Rheumatism	5	8	3	2		2 Als. h	6
Syphilis	13	6	8			3	8
Pneumonia		3	1	1			1
Mania	7		2				5
Gonorrhœa	1	5	3				3
Catarrh	1	4	4		1		
Typhus Icteroid.	12	14	16		8		2
Febris Intermit.	2		2				
Dropsy		1					1
Phthisis Pulmona.		1			1		
Typhus Mitior		1			1		
Dysentery		3	3				
Diarrhœa	5	3	6				2
SURGICAL.							
Sore Legs	7	8	6				9
Syphilis	5	6	3			1	7
Frozen Limbs	1		1				
Tumors		1					1
Opthalmia	1	1	1				1

Result for October, 1798.

Remaining from laſt month,	59	
Received this month,	64	
		—123
Cured,	59	
Relieved,	3	
Died,	11	
Removed to the Alms-House,	2	
Diſcharged diſorderly,	4	
Under care,	44	
		—123

November, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Dif. dif. and eloped.	Under Care.
MEDICAL.							
Rheumatism	6	11	10	2			5
Syphilis	8	14	7			2	13
Pneumonia	1	3	1		1		2
Mania	5						5
Gonorrhœa	2	3	2			1	2
Typhus	1				1		
Febris Intermit.		1	1				
Dropsy	1					1 Als. h.	
Diarrhœa	2	3	2	1			2
Dysentery		3			1		2
Phthisis Pulmona.		1			1		
SURGICAL.							
Sore Legs	9	10	8			2	9
Syphilis	7	5	3			2	7
Tumors	1			1			
Opthalmia	1	1					2

Result for November, 1798.

Remaining from last month,		44
Received this month,		55
		99
Cured,		34
Relieved,		4
Died,		4
Removed to the Alms-House,		1
Discharged disorderly,		7
Under care,		49—99

December, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Dif. dif. and eloped.	Under Care.
MEDICAL.							
Rheumatism	5	13	6	4	1		7
Syphilis	13	8	9			3	9
Pneumonia	2	6	5		1		2
Mania	5	2			1		6
Gonorrhœa	2	5	4			1	2
Typhus		1			1		
Dropsy		1					1
Diarrhœa	2		2				
Dysentery	2	1	2		1		
Phthisis Pulmona.		2			1		1
Pleuritis		4	4				

December continued.

DISEASES. SURGICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Dif. dif. and eloped.	Under Care.
Sore Legs	9	4	3	1	9
Syphilis	7	6	2		11
Fracture		3			3
Opthalmia	2	1	1	1	1
Contusion		2	1		1
Tumors		1			1

Result for December, 1798.

Remaining from last month,		49
Received this month,		60
		—109
Cured,		39
Relieved,		4
Died,		6
Discharged disorderly,		6
Under care,		54
		—109

SUMMARY

For October, November, and December, 1798.

Patients remaining under care at the end of the quarter terminating December 31,		53
Patients received within the last three months,		176
		—229
Of these have been cured,		139
relieved,		10
have died,		21
removed to the Alms-House,		5
there remain under care, January 1, 1799,		54
		—229

General Result for the second half-year of 1798.

Number of patients under care on the 1st of July, 1798,		85
Number received within the second half-year of 1798,		331
		—416
Cured,		270
Relieved,		19
Died,		35
Removed to the Alms-House,		8
Discharged disorderly and eloped,		31
Under care,		53
		—416

SUMMARY

For the whole year of 1798.

Number of patients under care from last year, January, 1798,	90	
Number received within the present year,	580	
		670
Of these have been cured,	461	
relieved,	35	
died,	55	
been removed to the Alms-House,	9	
discharged disorderly,	34	
by desire,	8	
eloped,	14	
Incurable,	1	
Under care, January 1, 1799,	53	
		670

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

IN our last number, the intelligence concerning the pestilential epidemic of the summer and autumn of 1798 was unavoidably imperfect. Even to the present time, notwithstanding much solicitude and exertion on this subject, we have not succeeded in obtaining satisfactory details from all the seats of pestilence in the United States. Such, however, as have come to hand we now proceed to lay before the reader as distinctly as our materials will allow.

From Portsmouth (New-Hampshire) we have yet received nothing but vague reports.

At Salem (Massachusetts) there was a general prevalence of health at that season; though several cases of yellow fever, and some of them fatal ones, occurred. Dr. Oliver very judiciously inclines to the belief, that the exemption of this town from the ravages of yellow fever, is owing, 1st, to the remarkably clean state of the town; and, 2dly, to the houses being placed at such distances as to admit of free ventilation. It was observable that the yellow fever had a *spontaneous* origin in two different places of the town, where putrid matters had been suffered to accumulate, and proved fatal to two persons in different families; these unclean spots forming exceptions to the generally purified state of the town.

From a very respectable source we are informed that the disease made its first appearance in Boston on the 21st of June. In the family attacked at this early period, two persons died; one on the third, the other on the second or third day of the disease. Two others recovered with much difficulty. After the lapse of a month, on the 21st of July, the disease again appeared near the former place. Seven persons in this neighbourhood were seized within a short time, and all died. For two or three weeks all the cases which occurred were of persons residing at or frequenting this place, near the market; and, it is reported, that of twenty or more, first seized, not one recovered. The vicinity of the market-place and Fort-hill were the principal seats of this pestilence: the former sunken, and serving as a reservoir of all the filth wafted by rain or otherwise from the adjacent more elevated grounds; the latter greatly exposed to reflected heat, badly ventilated, and the sickly parts of it very thickly inhabited. In and near both these situations large quantities of putrid hides and of putrid beef were stored. Many pointed instances of malignant disease, derived from these sources, are mentioned in this important communica-

tion from our correspondent, which will be inserted at large in our next number. Upon the whole, no doubt seems to be entertained in that town of the domestic origin of the disease. The number of deaths in Boston has been stated at 250, but it is believed that 300 do not exceed the real amount. The disease prevailed with great malignity till about the middle of October, when it was checked by a storm from the north-east of three days continuance.

We are informed by Dr. Wheaton, that Providence, in the State of Rhode-Island, has been remarkably healthy during the late season. There have been only four or five cases that could be properly denominated cases of the late prevailing pestilence. In the northern extremity of the town, elevated and generally healthy, thirty or forty cases of a low continued fever appeared during the hot season, only two or three of which proved mortal. —Opinions have been divided as to the origin of this fever: for while the drawing off of a mill-pond, not more than a quarter of a mile westward of this neighbourhood, at the commencement of the hot and dry weather, seemed to afford a satisfactory explanation of the effect, much stress was laid upon the situation of a number of tan-yards in this quarter, stocked with a pretty large quantity of imported hides, more or less damaged, and deprived of the usual supply of water by the excessive drought.

The principal part of our information concerning the disease, as it appeared at New-London, is derived from a judicious publication of Mr. Charles Holt. It is remarked, in this pamphlet, that the infection, which first appeared about the 24th of August, was confined to a particular part of the city, chiefly within an hundred rods north and south from the market. In a defined space below the market, excluding the buildings which were evacuated, and the people who fled, are fifteen houses, shops and stores, in which lived, or were employed, ninety-two persons— of whom ninety had the fever, thirty-three died, and two escaped. The deaths above the market were not in so great a proportion. By October 28, the fever had nearly disappeared, after having, in about eight weeks, cut off eighty-one persons. The author considers the idea of importation as incapable of support either by fact or argument; and, therefore, hesitates not to ascribe it to domestic causes. He particularly states, that the disease was not spread or communicated by infected persons, clothes, or other substances. People who had been in the infected part sometimes carried the disease into the country, and there died of it; but without any other person receiving the infection from them.*

* Mr. Holt mentions one or two exceptions to this general obſervation; but as there is no ſpecific detail of circumſtances, it is preſumed ſome miſ-

With respect to the city of New-York, it appears, from accurate documents, that the number of deaths from August 1st to November 10th, amounted to 2086. The committee of the Medical Society appointed to inquire into the origin, causes and prevention of this epidemic, have brought in their report, which has been received, and ordered to be published by the society. This report rejects, in the most unqualified terms, the opinion of the importation of the disease from abroad, and asserts, that "these stories were founded in misrepresentation, and fostered by prejudice." The sources whence the disease originated in various parts of the town are distinctly pointed out, and the means of averting such calamities in future judiciously recommended.—Similar principles are also maintained in the reply of the joint Committees of the Corporation of the city, of the Health-Office, and of the Chamber of Commerce, to the general Committee of citizens in Philadelphia—for which see the Appendix.

In the State of New-Jersey, it is affirmed, on good authority, that many instances of yellow fever were observed. Several cases of the disease occurred to Dr. Elmer, of Bridgetown, and to Dr. Lummis, of Woodbury. These gentlemen concur in asserting that the disease originated from local and domestic causes.

In our account of this epidemic in Philadelphia, as inserted in the last number, the amount of deaths was inaccurately stated. The whole number of victims, exclusive of those who died in the country, were 3645. As much diversity of opinion exists in that city, concerning the origin of their pestilential diseases, we think proper to quote, as an authority deemed respectable by all sides of the question, the answer of the President and Managers of the Marine and City Hospitals to a number of inquiries concerning the disease, propounded by the Secretary of the Commonwealth of Pennsylvania, under the direction of the Governor. These gentlemen declare, that "the law, in respect to quarantine, has been construed and executed in the strictest sense. "Every power and effort which the Board, or the officers under "their direction, were capable of exercising, has been employed to "cut off all communication with the vessels under quarantine. "Every possible mode of purification, which a law so manifestly "defective would permit, has been adopted, and the most rigid "scrutiny had, before the vessels were permitted to proceed to "the city. At the Marine Hospital the fences were extended "into the river, the more completely to enclose the premises, and "all intercourse therewith precluded.—Unshackled by prejudice, "and diffident of opinion, we have endeavoured to trace the dis-

take has been committed. And we are confirmed in this presumption by very valuable communications concerning the epidemic of New-London, from the Rev. Mr. Channing, and Dr. Coit, received since the above went to press, which will be inserted in our next number.

" ease to its origin, but without success. Those objects which " have been pointed to with the greatest confidence, as the foreign " source of the disease, on investigation afford no such proof."

From Savannah, in Georgia, we learn that the late season has been very unhealthy. Dr. Lemuel Kollock, physician in that town, informs us that they " have experienced a large share of " severe sickness in the last summer and fall. Bilious remittents " are the prevailing diseases of our climate; but this year, from " the severity of heat and drought, succeeding great and conti- " nued rains in the spring and beginning of summer, they have " been more severe and obstinate than ordinary."

Upon the whole, it appears to us that a great mass of concurrent evidence, derived from different places, and substantiated by various combinations of facts, decisively opposes the doctrine of imported contagion, and establishes the domestic generation of the late pestilence in the United States.

Philadelphia, Jan. 10.

At a meeting of the American Philosophical Society, held at their Hall, on Friday the 4th day of January, 1799, between the hours of 2 and 5 P. M. for the election of officers for the ensuing year, the following persons were duly chosen:

THOMAS JEFFERSON, *President.*

Casper Wistar, Benjamin Rush, Robert Patterson, *Vice-Presidents;* John Vaughan, *Treasurer;* Thomas C. James, James Woodhouse, Samuel H. Smith, Adam Seybert, *Secretaries;* Charles W. Peale, Benj. S. Barton, Nicholas Collin, *Curators;* Robert Blackwell, Thomas M'Kean, Adam Kuhn, James Davidson, *Counsellors.*

The following donations and communications were received by the American Philosophical Society during the last six months.

A copy of Geo. Adams's work on the microscope, with a volume of plates—also, Adams's Geographical Essays, corrected by William Jones, with plates: presented by William Jones, Esq. London.

A letter from Dr. Priestley, being an appendix to his former communications, on the decomposition of water.

A communication from Mr. Andrew Ellicot, determining the latitude and longitude of the town of Natchez.

Dr. Barton's " New Views of the Origin of the Tribes and Nations of America," second edition: presented by the author.

Three barrels, containing the bones of non-descript animals, and two meteorological journals kept at Detroit, and on a voyage to Michilimacanac on the Lakes, by General Wilkinson.

A specimen of Mica, from New-Hampshire, presented by Mr. Passmore.

Seven half volumes of the American edition of the Encyclopædia, which complete the work: presented by Mr. Thomas Dobson.

A "Memoir on the Sand Hills of Cape Henry, Virginia, by H. B. Latrobe."

"Experiments and Observations on the Atmosphere of Marshes, by Adam Seybert, M. D."

A paper "Concerning the pernicious effects of the Equizetum Hyemale, or Rough Horsetail, when eaten by Horses, by B. S. Barton."

An answer to Dr. Priestley on the doctrine of Phlogiston and the decomposition of Water, by James Woodhouse, M. D.

January 7th, 1799. ADAM SEYBERT, *Secretary.*

THE MEDICAL LECTURES, at DARTMOUTH COLLEGE, commence the first of October annually, and continue ten weeks, on the following branches, viz. ANATOMY, SURGERY, and MIDWIFERY; CHEMISTRY and MATERIA MEDICA; THEORY and PRACTICE of PHYSIC.

This institution was established in August, 1798; *at which time the degree of* BACHELOR IN MEDICINE *was conferred on* JOHN ADAM GALLUP, Bethel, Vermont; LEVI SABIN, Rockingham, Vermont; and the honorary degree of M. D. on LYMAN SPALDING, of Harvard.

Present Medical Officers.

NATHAN SMITH, A. M. *Professor of Medicine, Lecturer on Anatomy, Surgery, Midwifery, Theory and Practice of Physic.*

LYMAN SPALDING, *Lecturer on Chemistry and Materia Medica.*

Dysentery caused by Nitrous Acid.

Daniel D. Walters, Apothecary in New-York, relates of himself the following case of the effects of aqua fortis (septous acid) taken into the stomach. He had exercised himself considerably on a day near the end of April, 1798, and had become thirsty; entering his shop in this situation, he took a large bottle, which he supposed to contain water, applied it to his mouth and drank heartily; immediately after swallowing the last mouthful, he was sensible of a sourish disagreeable taste, and on inquiry, found that his boy, instead of putting the water for drinking into the accustomed bottle, had poured it into another bottle of the same material, size and capacity, standing beside it: neither of them being marked or lettered; and the bottle into which the water, by mistake, had been poured, was the one in which aqua fortis had been kept and not completely poured out. The liquid he swallowed was therefore a dilute aqua fortis (septous acid). Within a few minutes a deadly and intolerable nausea came on, which, within a quarter of an hour, ended in vomiting. After this he felt better till some time after, when pain, griping and flatus came on, and about fifteen hours after taking the dose, tenesmus and bloody

stools followed: these latter symptoms were attended with headache and fever, and the dysentery lasted two days, and gradually went off, no medicine having been taken.

The brother of Mr. Walters, who drank of the same acidulated water, was also excessively incommoded by it, and was put in extreme danger of dying.

Dr. Duncan, professor of the Institutes of Medicine in the University of Edinburgh, in a letter to Dr. Miller, proposes to send annually to the library of Columbia College in this city, a copy of the Inaugural Dissertations published at that University, with the expectation of receiving those of the College in exchange. It is scarcely necessary to observe that this proposal will meet a ready concurrence.

It was stated in our last number, that the *Elk* was a different animal from the *Moose;* of this we have further confirmation, by having had an opportunity of several times seeing a Moose, now exhibited in New-York. He is 17 months old, and was taken in the Province of *Maine*. The reader may rely on Pennant (2 Art. Zoology, p. 18.) for the description and history of the *Moose*.

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*On the Friendship of Birds.** By *Mr. S. Simpson, of New-York.*

Mr. Myers, a brother-in-law of mine, moving from Wilton to Philadelphia, desired me to send for a large turkey-cock and hen, and a pair of bantams, which had been a long time in his yard, and which the family did not choose to have killed. Accordingly, after his departure, I had them brought home, and put with some other poultry that were then running in my yard. Some time after, as I was feeding the poultry from the barn door, a large hawk turned the barn, and suddenly made a pitch at the bantam hen; she immediately gave the alarm, by a noise which they generally make on such occasions, when the large turkey-cock, who was about two yards distance, and who I presumed saw the hawk's intentions, and the imminent danger of his old acquaintance, flew at the hawk with such violence, and gave him such a severe stroke with his spurs as he was going to seize his prey, as to knock him from the hen to a considerable distance; and the timely aid of this faithful auxiliary, the turkey-cock, saved the bantam from being devoured by the hawk.

On the Sagacity of Birds. By the same.

During my residence at Wilton, early one morning I heard a noise from a couple of martins, who were jumping from tree to tree adjoining my dwelling. They made several attempts to get in a box or cage fixed against the house, which they had before

* See Medical Repository, vol. i. p. 367.

occupied; but they always appeared to fly from it with the greatest dread, and repeated those loud cries which first drew my attention. Curiosity led me to watch their motions. After some time a small wren came from the box or cage, and perched on a tree near it, when her shrill notes seemed to amaze her antagonists. After some time she flew away. The martins took this opportunity of returning to their cage: but their stay was short. Their diminutive adversary returned, and made them fly with the greatest precipitation. They continued manœuvering in this way the whole day, and I believe the wren kept possession during the night. The following morning, on the wren's quitting the cage, the martins immediately returned, took possession of their mansion, broke up their own nest, which consisted of twigs of different sizes—went to work, and with more industry and ingenuity than I supposed they possessed, they soon barricaded their doors. The wren returned, but could not re-enter. She made attempts to storm the works, but did not succeed.—I will not presume to say that the martins followed our modern maxim, and carried with them a sufficiency of food to sustain a seige, or that they made use of the abstinence which necessity sometimes, during a long and bad storm, might probably occasion; but they persevered, for near two days, to defend the entrance within the barricado: and the wren, finding she could not force an entry, raised the seige—quitted her intentions—and left the martins in quiet possession, without further molestation.

We are obliged to Dr. J. E. White, *of Waynesborough, in Georgia, for an Account of the two following Cases:*

1. *A Case of Syphilis treated by the Nitric Acid.*

The patient (a negro man) had contracted the disease three weeks previous to his being put under my care, and nothing had been administered. Upon examination, I discovered the glans penis covered with a number of small distinct chancres; and, on the side of the penis, one of a considerable size. Buboes had also made their appearance: the one in the right groin was nearly as large as a bird's egg, and blotches had come out on different parts of the body, more particularly the face. I immediately directed the following drink:

℞ Acidi Nitrosi, fort. ʒ iss.
Aquæ Communis, ℔ iss.
M. Bibat quotidie.

The ulcers I washed with a solution of the hydrar muriat. in water, a grain to the ounce, and sprinkled over them a little calomel; but made no application to the inguinal swellings.

The above drink he took (sweetened) for five days, when, dis-

covering that it produced no effect on the stomach or bowels, I increased the quantity of the acid to ʒ ij. daily; which was continued for about two weeks, when I discharged him with very small remains of one of the swellings, for which I directed a little longer use of the acid.

After he had taken the nitric drink about a week, the chancres on the glans were entirely healed: the other closed soon after. The swellings gradually diminished in size, and the blotches very soon disappeared. Throughout the whole time of his taking the drink, I never discovered the least disagreeable effect to be produced on the first passages.

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2. A Case of Epilepsy treated by Argentum Nitratum.

The patient was a boy aged six years. He had laboured under the disease from the time he was eighteen months old. The fits recurred most frequently in the night, generally to the number of four or five; but he has been known to have sixteen in that space of time. He rarely passed a night without having more or less, except once, for about two months, when they entirely ceased; but they very seldom recurred during the day. Various remedies had unsuccessfully been tried, and the fits had now become worse than ever they had been known, returning very frequently both night and day.

I was applied to, and thought it a fair case for giving the nitrated silver: I accordingly directed it in the following manner:

℞ Argent. Nitrat.
Medull. Pan. aa. ʒ ss.
M. and divide into thirty pills;

One to be taken night and morning. After he had taken four of the pills the dose was increased to three in the day, (one being taken at noon) without producing any sensible effect. He had continued their use but four days, before the fits seemed to be suddenly arrested in their progress towards a fatal termination, and he remained entirely free from them for nearly two weeks. He had now a very slight return of them, and I ordered five pills to be given in the day. This dose was continued for a short time, when I increased the quantity of the argentum nitratum in each pill, to one grain and a half, of which he took four in the twenty-four hours, for a few days, (still remaining entirely clear of his complaint) when he was seized with the fever of this climate, which, from inattention, quickly put a period to his existence.

Though it cannot be determined what would have been the issue of this case, yet, in my opinion, the most unequivocal proofs were given of the good effects of the medicine; and I shall not fail, in future, to make trial of it in cases that I may deem proper for its exhibition.

FOREIGN.

[*The following paragraphs are taken from the Monthly Magazine for Sept.* 1798.]

THE second edition of Dr. Rollo's work on the '*Diabetes Mellitus*,' with the results of the trials of various acids and other substances, in the treatment of the lues venerea, containing many additional facts and illustrations, is in the press, and will be ready for publication early in November next.

Mr. Blair, surgeon of the Lock Hospital, &c. is upon the eve of publishing *another* Collection of Cases and Observations on the Effects of the new Anti-Venereal Remedies, which have been proposed by various medical gentlemen in the treatment of Syphilis.

Dr. Frederick Hirsch, dentist to several German courts, has lately published the following account of an approved '*Remedy for the Tooth-ache:*'

'In the practice of my profession of a dentist,' he says, 'I have particularly turned my attention to the cure of the tooth-ache, and I learned from a celebrated German physician, as well as from the *Journal der Erfindungen*, *&c.* "Journal of inventions, theories, and contradictions, in natural philosophy and physic," No. xiv. p. 135, that among other insects the well known ladybird, *Coccinelle septempunctata*, possessed a peculiar virtue against the tooth-ache; I was induced to collect some of these insects. On repeated trials I found it to exceed my expectations, and I was so happy as to cure several persons speedily and completely with this small insect, finding myself obliged to repeat the remedy only in the cases of a few female patients. My method of proceeding was as follows: I crushed the insect between my thumb and fore-finger, and rubbed it between them till their points grew warm. With the fore-finger and thumb thus prepared, I then rubbed both the affected parts of the gum, and the aching tooth; upon which the pain, in every instance, except in the case mentioned above, completely ceased; I found, likewise, that the medicinal virtue of this insect was so powerful and durable, that my fore-finger was capable of removing the tooth-ache for some days after, without crushing an insect on it afresh. It is not to be expected, however, that this insect, when preserved dead, should produce the like effect; as then its internal parts, in which its virtue may be presumed chiefly to reside, are wholly dried up, leaving nothing but the wings and an empty shell. I could wish, therefore, that some skilful physician would impart to me, from his own experience, a method of preserving the virtue of this insect, so that its efficacy may be in full vigour throughout the year.'

Mr. Humbolt has made several experiments on the subject of the germination of seeds in the oxy-muriatic acid, and has found that this acid has a remarkable effect in accelerating the progress of vegetation. The seeds of garden cresses, when thrown into the fluid at the temperature of 88, shewed germs in three hours, while none were seen in water in 26 hours. Professor Pohl, at Dresden, produced, in this manner, vegetation from dried seeds in a collection of plants 120 years old, and Messrs. Jacquin and Vander Schott, at Vienna, have caused the growth of old seeds in the botanical garden, which had resisted every other method.

Mr. Vauquelin has made a new analysis of the red lead ore of Siberia, and asserts that it contains a new metallic acid, to which he gives the name of *Chrome*, on account of its property of colouring every substance combined with it.

The Royal Academy of Medicine at Barcelona has proposed the following question: Whether Cold Baths are useful or prejudicial in disorders in the breast, and what their effects, according to circumstances?

The Royal Society of Copenhagen has proposed the following prize questions:

"What will be the data for estimating the quantity of heat produced in different circumstances, and by different combustible materials used in œconomical purposes, such as wood, turf, fossil and pit-coal of every species? These must be calculated at least for four different cases: 1st. Where the fuel is burnt in a stove, in order to heat a given quantity of air, as in a chamber: 2d. When employed for boiling any liquid: 3dly. When used for hardening any soft substance, as in baking bricks: 4thly. When employed for melting any hard body, as in fusing metals in an assaying or melting furnace. These experiments must be so instituted, that from them may be computed both the proportional effects of each method of applying heat, and the œconomical advantages of each species of fuel."

Agriculture. Modern husbandry has introduced many important improvements in the rotation of crops, but perhaps few more advantageous than the late one of sowing turnips after flax, hemp, and crops of that kind, as is done in several different countries.

Many useful discoveries have unquestionably been gradually introduced in the feeding of domestic animals by different English farmers; but there are many roots that have been but little attended to in this point of view in this country: of this kind is the *parsnip*, which from its containing a large portion of the sac-

charine principle, must be highly nutritious: on trial, it has indeed been found, both in Guernsey and Jersey, where it is cultivated on a large scale, to be extremely profitable for fattening hogs and different kinds of poultry.

Another improvement of this sort is much less attended to by practical farmers than its importance seems to require. This is the bruising and proper reducing of corn before it is employed in the feeding of animals. If this be properly performed, the writer of this article is convinced, from a variety of trials, that a saving of at least one third of the grain may be effected. The principal objections to this mode of feeding are the trouble of performing the operation, and the expence of the utensils. The latter might, perhaps, be much obviated by an alteration of construction, and the former cannot be of much consequence in many situations. The subject, at least, in every point of view, deserves more consideration.

Though modern chemistry has certainly thrown great light on the operation of lime applied as a manure, the subject is not yet free from difficulties. The chief way in which it effects useful changes in lands is, however, most probably by promoting the putrefactive process, and thereby increasing the quantity of carbonaceous matter, and rendering new combinations favourable for vegetation more easy.

A German physician, of the name of Mark, discovered that acorns may be used with advantage as a substitute for coffee. Considering the dearness of this article, it will prove a discovery of much importance.

In the works of two late Italian writers on the agency of the gastric juice and saliva in rendering substances capable of absorption by means of friction, we observe the following notices:

The effects of opium, mixed with gastric liquor, are declared to be salutary.—By the report of Dr. Chiarenti, Dr. Brera was induced to repeat and vary the experiments; and with this view, he caused patients, in whose cases opium seemed to be indicated, to rub in about ten grains of this drug, mixed with a drachm of gastric liquor, twice or thrice in a day; and he affirms that great advantage followed the practice. He next tried other medicines. Thus he prepared a mixture of squill and gastric liquor; and he caused persons, ill of the dropsy, who had been disagreeably affected by the internal use of squills, to rub it into the loins, the thighs, and other parts. The experiment succeeded: the medicine proved diuretic, and the patients recovered. *Terra foliata tartari*, foxglove, and other articles applied in the same way, operate not less beneficially.—The gastric liquor is not the only animal fluid

that is fit for the purpose. Professor Brera is convinced, by multiplied trials, that opium, squill, sublimate, and tartar emetic mixed with saliva, equally exert their specific powers.

Fluids of a different kind seem not applicable to the same end. At least, the author affirms that squill, with volatile salve, gum-water, and with unctuous oil, proved totally inefficacious.

Dr. Brera supports his observations with trials made by Dr. Ballerini at Pavia, and by Dr. Benvenuti at Turin; and he promises to furnish reports, at large, of the several cases.

APPENDIX.

DOMESTIC.

ARTICLE I.

Affinities and Relations of Septic (Nitric) or Pestilential Fluids to other Bodies. In a Letter from Dr. MITCHILL, *F. R. S. E. Professor of Chemistry, Agriculture and Medicine, in the College of New-York, to Sir* JOHN SINCLAIR, *Bart. M. P. President of the Board of Agriculture, &c. dated New-York, the 28th of November*, 1796. *Intended as an additional Article to the proposed Report of the British Board of Agriculture on the Subject of Manures.*

SEVERAL of the publications of the Board of Agriculture, of which you are President, having been some time since forwarded to the Agricultural Society of New-York, all the members of that institution felt pleasure in knowing that a friendly communication was opened. I have, in a particular manner, experienced high gratification in the perusal of several of your tracts, but by none that I now recollect so much as by the report and papers on manures. For more than a year I have been convinced, that the pestilential vapours which kill annually so many of the inhabitants of the United States, are good manures, or are exhalations from substances that are convertible to good manures. Some of the facts that have led me to adopt that opinion are already before the public. In the pages I now offer to you, I have stated some additional considerations. It has been often remarked, and there is much truth in the observation, "that the most fertile countries are the least healthy." If the suggestions contained in the present letter have any weight, I entertain no doubt, that the connection between *fertility* and *distempers* will attract a due share of notice from the intelligent and observing gentlemen concerned in completing your grand survey. The preservation of health among the labouring classes of mankind, though so little the object of police, is nevertheless eminently interesting to humanity, and ought to form a special article in the code of rural œconomy. If it can be shewn what the cause of their sickness is, and what are the attractions and connections of this with other substances, a great step

will be taken towards the prevention of this class of human sufferings. In the mean time, I may mention I have not leaned more towards the *medical* contemplation of the matters before me, than seemed necessary to shew the connection, which is a very intimate one, between farming and physic.

While I was engaged in investigating the manner in which pestilential fluids exerted their powers upon the human body, and just after I had arranged the materials of my letter to Mr. Havens, an occurrence, of a kind novel to myself, befel a man in the infirmary of New-York. Being then in attendance as a physician, I was requested to take under my charge one of the patients in the surgeon's ward, who had, several days before, been seized with an intermitting fever, and severely handled by it. On inquiring into the particulars of his indisposition, I found the complaint for which he had been admitted into the house, was an ulcerated leg. This, for some time, had been dressed with red precipitate (septite of quick-silver) in such large quantities, that the bottom and sides of the sore were frequently covered with it in its undecomposed state, when, at the customary time, the surgeon's assistant renewed the dressings. Such a long continued and plentiful application of the escharotic seemed to have afforded septic (nitric) acid enough to be absorbed into the vessels, and apparently to work considerable effects upon the constitution. To this interpretation of the disease I called the attention of the by-standers, and the circumstances of the ulcer, with the febrile symptoms, had so much of the probability of cause and effect, that we were generally of opinion the feverish commotion might have been stirred up by the acid absorbed after its disengagement from the mercury.

This remarkable event engaged me in reflecting what should be the reason, if septic fluids are so very abundant in the air as they are proved to be, especially in large cities, situated and regulated as many of those in the United States are, and at the same time, if they were so easily absorbed as experience shews they may be, that their bad effects should not be more frequently felt, and mortality greater than that which prevails at present, be the consequence?

It soon appeared to me, that the pot-ash thrown into the streets with the dissolved soap which had been employed in washing, was possessed of qualities, enabling it to attract and attach these vapours, and existed in quantity sufficient to take a vast volume of them out of circulation. My ideas were reduced to a sort of system on the subject, by the following estimate. The city of New-York contains 60,000 inhabitants. One pound of hard or bar-soap is required to wash the clothes of ten persons for one week. The consumption of soap, therefore, by the citizens, will be $60{,}000 \div 10 = 6{,}000$ pounds a week. Strangers, sailors, and other

transient persons may be supposed, on an average, to amount to 5000, which will make the weekly consumption 500 pounds more. The quantity used up for cleaning houses, furniture, &c. and by barbers, scourers, &c. may be estimated as an additional 500. The whole weekly consumption thus amounts to $6,000+500+500=7,000$lbs. The yearly consumption will consequently be $7,000\times 52=364,000$lbs. One third of the whole weight of soap is alkaline salt, consequently the quantity of pot-ash expended and thrown away in the city of New-York, is $7,000\div 3=2,333\frac{1}{3}$lbs. every week, or $121,333\frac{1}{3}$lbs. upwards of 54 tons, per annum.

Such an amount of pot-ash is capable of counteracting the effect of an exceedingly great bulk of pestilential fluids, by attracting them to itself, destroying their aërial form, and thereby constituting salt-petre. If, as CHAPTAL computes (Elements of Chemistry, &c.) one hundred grains of pure nitre contain thirty parts of septic acid, joined to sixty-three of pot-ash, and seven of the water of chrystallization, then, upon the supposition that the whole of the alkali thrown into the streets is converted to nitre, there must be an addition of septic acid, equal to $\frac{30}{100}$th parts of the whole, to neutralize the salt; that is to say, $121,333\frac{1}{3}\times 30\div 100=36,400$lbs. or more than 16 tons of septic acid, requisite to turn such a mass of alkali to salt petre; and in the same proportion for any smaller quantity.

In the foregoing estimate, the whole quantity of soap is reduced to hard soap for the following reason. Soft soap is sold at a much lower rate than hard, because it is much weaker. It is therefore used in families more extravagantly, and it is presumable, that the same quantity of alkali is expended as there would be if hard soap, and none else, was used.

But the solutions of soap poured into the gutters are not the only sources whence the pot-ash is derived; for the wood ashes of hearths exposed, as it is, in yards, cellars, and ash-holes, or cast into the streets, furnishes a large additional portion of alkali. The fact I am about to mention shews, at once, the reality of such a process, and the existence of septic acid in our houses. On the lower floor of a rear building, in the city of New-York, the back part of a closet was a thin brick wall. On the outside of this wall, in the yard, the ash-house was built. The only separation between the ashes put there and the closet, was the narrow partition of bricks. Their substance was so porous, that, in the course of time, a saline efflorescence was observed on the bricks within the closet near the floor. On examination, the pot-ash, which had apparently penetrated through the wall, in a state of solution, was found to be changed to nitre, by a combination with septic acid, which it had doubtless attracted from the air of the room.

In these ways does it seem, that a considerable proportion of the

mischief is prevented which would be caused by such noxious steams, if left to float about at large. If the scrapings of this city were employed in the manufacture of salt-petre, they would unquestionably afford a large quantity of it. But as they are generally sold to the farmers for manure, it is worth the while to examine, what are the effects of the septite of pot-ash upon growing plants as a manure. Here, there might be safely an appeal made to the ancient and common opinion of mankind in favour of nitre as a fertilizer. But, as TROMSDORF (GREN. Journal der Physick, &c. 14. Monthly Review enlarged, Appendix, Art. x.) has made a comparative experiment on the growth of vegetables in distilled water, and in an aqueous solution of salt-petre, there will be no need of referring the matter to popular belief. He took two pepper-mint plants of equal weight, and put one into a vessel of distilled water, and the other into distilled water, wherein salt-petre was dissolved in the proportion of fifteen grains to half a pint. The plant placed in the solution of nitre grew more quickly and vigorously than the other; and, at the end of four months, on being weighed, had acquired 378 grains more than its fellow, which, as well as itself, had a healthy look, and emitted a strong scent. And what is very remarkable in this experiment is, that from the detonation of the dried powder of the sprig which had grown in the solution of nitre, that salt itself had not, in this instance, undergone decomposition by the vegetative power, but had been wholly absorbed by the plant.

This experiment of the operation of the septite of pot-ash deserves consideration in connection with those made by SENNEBIER (Experiences sur la lumiere solaire, &c. Mem. 2. § 1.) on the combination of *mineral* acids, as they are very unphilosophically called, with lime. He found that all the *mineral* acids (the *septic* being one) mixed with water, would cause an emission of pure air from the leaves of plants, exposed to the sun-shine; but that, in order to effect this, it was necessary to add mild calcareous earth (carbonate of lime) to the water with which these acids were mixed. The sulphuric acid turned this to gypsum (sulphate of lime); the septic changed it to calcareous nitre (septite of lime.) The fertilizing effect of the former is well known, and the character of the latter, as a good manure, is sufficiently established. But while these combinations with lime were forming, a quantity of carbonic acid (fixed air) was extricated from it, and mixed with the water. Experiments shew, that this acid, so blended with water, is absorbed by plants; the basis of the acid (carbone) being retained, and the oxygene discharged through the leaves. When vegetables are thus manured with gypsum, calcareous nitre, and fixed air, and are furnished at the same time with a sufficiency of light,

heat and water, it is not wonderful that they should live and perform their functions well.

If VAN MONS (CRELL Chemische Annalen, &c. 14 M. R. ubi supra, Art. 7.) is accurate in his experiments on the decomposition of the fixed alkalies, and his declaration true, that they contain septon (azote), then can it be conceived, that plants may acquire it from pot-ash, when this is used in its proper form as a manure, and the manner of its operation be comprehended. This view of the subject is the more important, as that experimenter affirms the fixed alkalies, like the volatile, are decomposed by substances that readily part with their oxygene, and during this process the *septous* (nitrous) *acid* is formed.

Though such a decomposition may happen, yet a more common effect of the vegetable fixed alkali (pot-ash) upon land, as a manure, is by absorbing the septic acid. Accordingly it is found to be useful upon a deep soil, containing a very considerable quantity of animal and vegetable substances; and upon those lands which the farmers call "dead" with over-manuring. (SOMMERVILLE on Manures, &c. Art. 33. p. 74.) Such an operation it possesses, too, in dung-heaps, forming, with their acid, a true saltpetre, as Mr. HEADRICK (Essay on Manures, p. 9.) testifies. But what is remarkable, is HOME's *direct* experiment that septous acid (spirit of nitre) mixed with water, promoted the growth of plants in a very perceptible degree. (Principles of Agriculture and Veget. p. 117.) *Hard* waters (Idem. Essay on bleaching) are found to owe their hardness to the *acid of nitre* joined to an absorbent earthy base (calcareous nitre); and this sort of water is found to afford a strong nourishment for plants. (Principles, &c. p. 113.)

The influence that the septic portion of the alkali of wood-ashes, both before and after its employment by the soap-makers, exerts as a manure, as well as the effect produced by septic acid and the septite of pot-ash, in furnishing septon to such vegetables as require it, will enable us to understand a fact, mentioned by SWINBURNE. (Travels into the two Sicilies, &c. p. 92.) When LAUTREC, at the head of the French army, invested Naples in 1528, his troops were cut off by a pestilential disease, which was greatly aggravated by the vapours exhaling from CORN, thrown into the ditches, and there corrupting in the water. This grain, which contains the principle of putridity, derived from the soil where it grew, in all probability combined, as it rotted, with enough of the oxygene of the water to form much septic oxyd and acid; and these diffusing themselves into the neighbourhood in the form of gas or vapour, were sufficient to render the place sickly, and even to destroy life.

The putrefaction of grain is particularly worthy of considera-

tion, as it respects wheat on ship-board. This sort of *corn* is remarkable for damaging the vessels in which it is exported from the United States. It rots their timbers, and causes them so rapidly to decay, that wheat in bulk is considered a very destructive freight. The reason seems to be, that a quantity of the grain falling through the flooring, slips between the timbers, and mingles with the moisture and bilge-water in the ship's bottom. Rotting there, it emits steams similar to those which arose from the ditches around Naples. These having no animals to exert their effects upon in the lower parts of the ship, attack the timbers, and spoil their solidity. Here now is an analogy which leads to the inquiry, whether the same pestilential matter which destroys men does not destroy timber too?

And this rotting of the timber of which sea-vessels are built, is connected with another fact well worthy of note, which is, that where the wood decays fastest, the corroding cause converts to rust, with proportional quickness, spikes and bolts of iron, driven there; the rusting of the metal depending upon the same cause as the rotting of the wood. And the ship-carpenters of New-York remark, that in repairing old vessels, even in doing inside-work, where the wood would seem to be penetrated chiefly by septic vapours, and not impregnated with sea-salt, the brightness of their axes and adzes is soon tarnished, and the steel is turned black.

This effect of the bad air of ships upon metals brings to my mind another memorable fact, from the Island of Jamaica. At Morant-bay some iron-guns had been thrown overboard from a vessel, and had laid partly buried in the mud or sand, between high and low water marks, for so long a time that they were considered as spoiled by the action of the salt-water. They were purchased as old-iron, to be melted down and cast into some kind of metallic ware at an air-furnace. On being dug up and examined, they were found, notwithstanding their exposure to the constant operation of the tides, to be less damaged, and in better order than the cannons exposed to the common air of that climate, in the fort. A similar fact is mentioned in 3 LOWTHROP's *Abridgment*, &c. p. 547. where, " at Point Cagua, the iron-guns of the fort were so corroded, that some were nearly become useless, being perforated almost like honey-combs; but the guns which lay in the salt-water were not much endamaged by rust, as we found by taking up some."—In this air, linen and silk are exceedingly apt to rot; and if a lancet be once exposed to the air, it will *rust* though it be presently put up again; though not disposed to rust if never exposed to the air. The relator affirms that in Jamaica metals *rust least in rainy weather*. The cause of these changes wrought upon metals must therefore be something different from sea-water or rain-water. It is doubtless the septic acid

vapours, which, at the same time, so miserably affect human constitutions, that wounds are with great difficulty healed, and fevers often terminate in death, under its destructive influence. (Hunter, Diseases of Jamaica, &c.) This is the *septic poison* (venin septique), to use the correct words of ARTHAUD, (Description de l'Hospital General du Cap, p. 12.) which rises after the fall of the autumnal rains in the Island of St. Domingo, sometimes almost suddenly destroying the vital principle; at others forming foul and gangrenous ulcers, and by its unconquerable malignity, causing wounds to resist all manner of remedies; and then again discolouring the skin, obstructing the mesenteric glands, keeping up a slow fever, inducing emaciation, and, finally, exhausting the strength by a serous flux. This aëriform venom brings on their plagues or malignant fevers, which, though of local origin, are generally said to have been imported in ships from the coast of Africa. (Histoire des Isles Antilles, &c. p. 2.) The natural diet and way of living among the American Carribbees often lengthened out their lives to one hundred and fifty years and more. (Ibid. p. 502.) On examining a considerable vocabulary of the Carribbee tongue, I have found no word to signify putrid or yellow fever. (Vocabulaire Caraibe, &c.) The Europeans, as they colonized these Islands, settled in unhealthy places, shunned by the wiser natives, or collected the materials of pestilential air, and manufactured from them deadly distempers on the spot. What a difference between their duration of life and that of the ancient Aborigines! The corrosion of iron, and *not by moisture*, is remarked by HILLIER (3 Ph. Trans. Abr. p. 625.) at Cape-Corse, on the coast of Guinea, during the *dry* weather, in a sickly climate. And what other exhalations can we suppose than these render Whidah so excessively unhealthy, that he who opens the ground, though it be but to dig a grave, runs the hazard of his life, from the pestilential steams which proceed from it? (Ibid.) Will not this connection between dryness and the decay of hard bodies explain the *dry-rot* of timber, (BATSON's Letter, &c. 2. Repertory of Arts and Manufactures, Art. xvii.) which ashes will stop?

Some precious remarks on the fixation of the *septous* (nitrous) vapours of manures by *earthy* substances are to be found in SCANDELLA's Letter to ARDUINO. (Outlines of the 15th chapter of the General Report, &c. addend. p. 12.) The author's observations, which were made for the Venetian territories, apply with great force to New-York, whose southern part is in nearly the same parallel of latitude with the north of Italy. SCANDELLA considers putrid diseases in the southern parts of Europe, if not originating from the septic exhalations of dung-hills and heaps of manure as their only cause, as certainly rendered more

dangerous by them. He observes, "they may be looked upon "as not far dissimilar from marsh-miasmata"—"and may afford "a fomes to periodical fevers." And in manufacturing manure in hot climates, he gives particular cautions against the putrid exhalations which it emits. The people of Great-Britain may imagine themselves secure from the noxious effect of these pestilential steams; but I have a confidence, if the matter was properly inquired into, they would find not only their jail, and ship, and hospital fevers originating from this effluvium, but that among their poor peasantry and manufacturers, though it is not concentrated enough to cause the high-wrought forms of febrile ailments in America, yet their typhus, in all its gradations, is fairly to be ascribed to the more feeble and gradual operation of these septic (nitric) vapours.

Are we not now enabled to understand the marvellous event related by GALEN, of the house in MYSIA set on fire by *pigeon's dung?* (3 De Temper. cap. 4. &c.) "Some pigeon-dung, "already putrid, and emitting vapours, and very hot to the touch, "had been thrown out in such manner that it lay in contact with "a wooden window that had been daubed with resin. About "mid-summer, as it received the direct rays of the sun, both the "resin and the wood took fire. The flames spread to some doors "and windows that were near, and also besmeared with resin, "and continued increasing until they invaded the house, and "consumed it." If the explanation I am about to offer be satisfactory, then will it appear what the precise nature of this effluvium from the dung was, and that the production of septous (nitrous) acid from the excrements of living creatures, and the corruption of dead ones, is almost as ancient as animal existence, and as extensive. But the property of this smoking and inflaming spirit *(spiritus nitri fumans et inflammans)* to set oily and resinous substances on fire by mixture, seems not to have been known until the experiment was made by O. BORRICHIUS. (Acta Hafn. Ann. 1671. Obs. 71.) It was repeated, and fully established, by FREDERICK HOFFMAN; and the fame of it drew LEIBNITZ and TSCHIRNHAUSEN from Berlin and Leipsic to witness it. (HOFFMAN. Obs. Phys. Chym. Lib. 2. Obs. 3.) There is great difficulty in precisely drawing the line between the oils, balsams, gums and resins. HOFFMAN, however, has shewn, that the *principle of acidity* (principio acido) added to *oil*, would *convert it to resin.* (Ibid. Lib 1. Obs. 15.) And this is exactly the modern opinion, that resins appear to be nothing else than oils rendered concrete by their combination with oxygene. The exposure of oils to the open air, and the decomposition of acids when applied to them, are considered as sufficient proofs of this conclusion.

Now, in order to interpret GALEN's fact, we have but to suppose the resin under-saturated with oxygene, and, consequently, capable of decompounding the septous acid. The evolution of heat, the bursting out of flame, and the combustion both of the resin and timber, follow, of course, as in the experiments related.

On a survey of this subject, I behold facts from all quarters pressing upon me. In this letter I have endeavoured to connect a few of them together in somewhat of a new order. But where will this immense inquiry end? Who shall define the extent of it? The septic compounds of which I am writing are but modifications of the "ACIDUM UNIVERSALE ET PRIMORDIALE," and the SAL UNIVERSALE ACIDUM PRIMOGENIUM QUOD IN IPSO AERE HOSPITATUR, ET QUOD, UT VETERES DIXERUNT, VENTUS IN VENTRE SUO PORTAT, of HOFFMAN, (Ibid. Lib. 2. Obs. 1.) and which, without knowing specifically what it was, SIMON PAULLI seems to have almost hit upon in his Παρέκβασις, p. 138. or Treatise on the Proximate Cause of Fevers. In this very learned and valuable performance, written more than a century ago, the author has shewn the dependence of malignant and petechial fevers, of measles, scurvy, syphilis, and a variety of other diseases, upon the same general cause, which he affirms to be a salt; "*Sal, sal dico, in sero massâque sanguineâ corruptum, ac volatile factum, iterumque fixum redditum, tam febrium* MALIGNARUM, *et in specie petechialium, quam* MACULARUM *in* MORBILLIS, *in* LUE VENEREA, SCORBUTO, *in* ELEPHANTIASE, *in* GANGRÆNA, *immo in* PESTE IPSA, *apparentium, et per consequens,* QUOQUE CONTAGII, *unicam et proximam causam.*"

This kind of compound seems also to have been almost expressed by DARWIN, (1 Zoonomia, Sect. xxviii. 2.) where the *hectic fever* supervening, by admitting air to an ulcerated surface, on opening an abscess, is ascribed by that elegant and original philosopher, to the *azotic*, rather than to the oxygenous portion of the atmosphere; though he appears since to have charged it to the oxygene; in which he has, probably, not bettered his judgment: the preferable opinion being, that they are *both* instrumental in stirring up febrile commotion in the system, by forming a septic fluid, producing, with an allowance for peculiarity of attendant circumstances, an effect analogous to the patient whose case I related in the beginning of this letter.

It surprizes me, in looking into SCHMEISSER's edition of VON USLAR's Observations on Plants, that so little is said concerning the operation of the *septic* principle (azote) on the vegetable economy; but septon, (azote) so long overlooked, will probably attract more attention for the future.

In expectation of great good to arise from the work in which

you have engaged with so much public spirit and benevolence, and in hope that examples of talents and enterprize like those possessed by Mr. VOGHT, the COUNT of RUMFORD, and Sir JOHN SINCLAIR, may become more frequent, I conclude, by subscribing myself, with much admiration, yours,

SAMUEL L. MITCHILL.

ARTICLE II.

TO THOMAS MIFFLIN, *Esq. Governor of the Commonwealth of Pennsylvania, from the Academy of Medicine of Philadelphia, on the origin and means of preventing the return of the* YELLOW FEVER.

SIR,

IN order to comply with your request to the Academy of Medicine, communicated by Dr. Samuel Duffield, consulting physician of the port, respecting the means of preventing the return of the epidemic fever which has lately afflicted our city, the Academy have conceived the history of its origin necessarily connected with their answer.

We believe it was derived from the following sources:

1. The exhalations of the alleys, gutters, docks, and common sewers of the city; and from stagnating water in its neighbourhood.

2. The foul air discharged with the ballast of the ship Deborah, and the cargo of the brig Mary; the former of which arrived from Hispaniola on the 18th July, and the latter on the 29th of the same month. We reject the opinion of an imported human contagion in either of the above vessels. It has not been asserted that any person died of the yellow fever on board the Mary during her voyage; and if it be said, that several persons died on board the Deborah of that disease, on her passage to this city, we cannot admit that they contaminated the timbers or contents of the ship in such a manner as to spread the disease to persons at several hundred feet distance from the wharf at which she was moored. The improbability of this opinion will appear from two considerations:

First—The disease is not contagious in the West-Indies; and rarely, if ever so, in the United States in hot weather, at which time *only* it makes its first appearance in our country. So general is this opinion, that some physicians have unfortunately refused to

admit the existence of the fever in its commencement in our city, *only* because it was not contagious.

Second—The disease was, in no instance, propagated by those persons who were supposed to have derived it from human contagion, adhering to the timbers or contents of the Deborah and Mary, and who died with it in parts of the city remote from the influence of the foul air of those vessels.

If it be said that the contagion of the yellow fever is not uniform in its effects, it ought at least to be admitted, that it acts with most certainty where it exists with most force; but the reverse of this took place in the supposed origin of our late fever from imported contagion. We are the more determined in our opinion of the foul air of the Deborah and Mary being the cause of many cases of our fever, from similar cases of fever having been often produced from similar causes, instances of which were mentioned in our letter to you of last year.

In support of our opinion of the disease being derived from the exhalations of our city before enumerated, we shall mention the names of the following persons, who had the fever before the arrival of the Deborah and Mary in our port, viz. Benjamin Jones, Fromberger's Court, June 2d; Mary Wrigglesworth, near the corner of Walnut and Tenth streets, June 6th; Rebecca Trested, in Front, between Spruce and Union streets, June 11th; Eliza Curran, Fourth below South-street, 27th June; Mark Miller, Callowhill-street, and Molly Zeller, Race-street, July 3d; Miss Byrne, Spruce between Second and Third streets, July 11th; Mr. Vannost, Shannon-street wharves, July 12th. We observed, moreover, and heard of a considerable number of persons who had the disease in the western parts of the city, and in Southwark and the Northern Liberties, who had not been exposed to contagion, nor breathed the air in the neighbourhood of Water-street for many weeks, and in some instances for several months, before they were attacked by that fever.

In addition to the arguments in favour of the domestic sources of the fever, that have been mentioned in our former letter, we shall add four more, that we think cannot be refuted.

1. The atmosphere of our city, during the prevalence of the fever, produced sensations of pain or sickness in many people who came into it from the country; the same atmosphere became the cause of the disease and death in others who visited the city, and who carefully avoided lodging, or any intercourse with persons infected by the fever.

2. The disease prevailed in many inland towns of the United States which had no intercourse with those sea-port towns in which it was epidemic. Those towns were, in every instance we have heard of, situated near to putrid substances, or stagnating water.

3. The disease was rarely contagious, even when it terminated in death, when carried into the country, or into towns not exposed to putrid exhalations.

4. The general extinction of the disease by frost, clearly proves that it exists chiefly in the atmosphere; and that it is not derived, in the first instance, from human contagion; for frost, it is well known, does not act in the autumnal months upon the bodies of the sick, nor upon their beds, cloathing, or any other supposed receptacle of contagion.

We wish to direct the attention of our fellow citizens to the history of the causes and remedies of pestilential diseases in foreign countries. In the ages of medical superstition, when those diseases were believed to be imported, they nearly depopulated cities for many successive years. Frequent and accumulated suffering at last begat wisdom. The causes of pestilence were discovered to exist in all countries, and domestic remedies were applied to remove them. The effect of this change in the opinion and conduct of the nations of Europe, has been the almost general extirpation of malignant fevers from their cities and sea-ports. We have many documents to prove that the recurrence of the yellow fever has been prevented in the cities of Europe by cleanliness. It formerly prevailed in Italy, Spain, France, Germany, Holland, and, occasionally, in Britain and Ireland, under the names of putrid, malignant, and bilious fevers, also of the *gall sickness* and of the *black fever*. The last name was derived from the black vomiting which is so often the symptom of approaching death in bilious fevers.

We are the more confirmed in the opinion we have delivered, that the yellow fever is a native disease of our country, by discovering that the same opinion is held by most of the physicians and citizens of our sister states. We lament the prevalence of an opinion, that the admission of truth upon this subject will injure the credit of our city. Truth, upon all subjects, is ultimately friendly to general interest and happiness, while the remedies of the evils of error are always of a partial and transitory nature. We conceive that the report of the existence of a disease of a nature so subtle as to elude the utmost force of the health laws, and the greatest vigilance of health officers, will be much more injurious to our city, than a belief of its being derived from causes which are obvious to our senses, and which, by active exertions, might be *easily* and *certainly* removed, without oppressing or injuring our commerce.

We shall repeat, in this place, the means recommended by us in our former letter, with the addition of some others, for preventing a return of the disease.

1. "Removing all those matters from our streets, gutters, cel-

lars, gardens, yards, stores, vaults, ponds, &c. which, by putrefaction in warm weather, afford the most frequent cause of the disease in this country. For this purpose we recommend the appointment of a certain number of physicians, whose business it shall be, to inspect all such places in the City, the Northern Liberties, and Southwark, as contain any matters capable, by putrefaction, of producing the disease, and to have them removed.

2. "We earnestly recommend the frequent washing of all impure parts of the city in warm and dry weather, by means of the pumps, until the water of the river Schuylkill can be made to wash all the streets of the city; a measure which we conceive promises to our citizens the most durable exemption from bilious fevers of all kinds, of domestic origin.

3. "To guard against the frequent source of yellow fever from the noxious air in the holds of vessels, we recommend the unlading such vessels as contain cargoes liable to putrefaction, and the discharging the ballast of all vessels, at a distance from the city, during the months of June, July, August, September and October—To prevent the generation of noxious air in the holds of vessels, we conceive every vessel should be obliged by law to carry and use a ventilator; and we recommend, in a particular manner, the one lately invented by Mr. Benjamin Wynkoop. We believe this invention to be one of the most important and useful that has been made in modern times, and that it is calculated to prevent not only the decay of ships and cargoes, but a very frequent source of pestilential diseases of all kinds in commercial cities."

4. The filling up, or cleansing the docks in such a manner, that no matters capable of putrefaction shall be exposed to the rays of the sun at low water.

5. The closing the common sewers, so as to admit water only; and the daily removal of the filth of the city, destined to flow into them, by means of covered carts or waggons made for that purpose.

6. The prevention of the filth of the city from being accumulated, and stagnating in its neighbourhood.

7. The prohibitions of alleys and narrow streets in the future improvement of the city.

8. An alteration of the present health law, which, by detaining vessels with perishable cargoes for ten days at the hospital, in hot weather, is calculated to increase the foul air in their holds; and we recommend also, that no vessel, owned by a citizen of Philadelphia, be permitted to leave or enter our ports, that is not provided with a ventilator.

We shall conclude our letter by deprecating, in the most solemn manner, the continuance of a belief in the supposed importation

of our fever, an opinion which has led to the total negligence of the means of preventing its return; also by humbly hoping that a merciful Providence may not correct our ignorance and prejudices, by frequent returns of a calamity, which has, in five years, swept away ten thousand of our inhabitants, and which, in a few years, may, if not obviated by the only proper remedies, (under the influence of the present inflammatory constitution of the atmosphere) annihilate our city.

Signed by order of
The Academy of Medicine of Philadelphia,
PHILIP SYNG PHYSIC, *President.*

JOHN C. OTTO, *Secretary.*
December 3, 1798.

ARTICLE III.

Correspondence between the Citizens of New-York and Philadelphia, respecting Arrangements to guard against PESTILENTIAL DISEASES.

No. I.

Letter from Philadelphia to the Mayor of New-York, the Chamber of Commerce, and generally to the Citizens.

GENTLEMEN, *Philadelphia, Dec.* 3, 1798.

THE late distress, occasioned by the spreading of an infectious malignant fever, in this and other towns in the United States, has excited the fears and fixed the attention of all classes of citizens who regard either life or health.

It is to avoid entering upon a field of controversy, more irritating than profitable, that we content ourselves with saying, that this most afflicting malady was either imported among us from abroad, and found, in our air, qualities very favourable to its progress; or has originated among ourselves, from the impure state of air or water, or both.

Hence the necessity of endeavouring, as far as Providence hath put it in our power, to guard against foreign importation and domestic origin. The measures to be pursued to prevent its rise among ourselves must be the subject of separate consideration and precaution, adapted to our respective situations.

Laws calculated to prevent its introduction from abroad are of general concern, and require a similarity of proceedings. The same preventatives which, if adopted in a detached manner, may be wholly insufficient, if done in concert may have the happiest effects.

Experience has taught us the extreme difficulty of providing quarantine laws of a nature so energetic as to answer the desired purpose, especially when introduced only by one State, while its adjoining State may be inattentive to the subject.

Considerations offer, at the same time, which indicate, if not the impracticability, at least the extreme difficulty, of introducing efficient quarantine regulations: the extended coast of the United States: the manners of the people—unaccustomed to severe prohibitions—and the nature of our government. It is the opinion of some among us, that a total prohibition, in the months of ——— of all commerce from the ports of the Mediterranean and the West-India islands, during the present war, will be the only measure on which we can rely for effectual security against the introduction of this most dreadful scourge.

We are fully aware of the delicacy and danger of interrupting the course of commerce: we think it ought not to be done but in case of absolute necessity: we sympathise most sincerely with our mercantile brethren, on the peculiar hardship such a measure would bring upon them: we wish it not to be adopted but upon the most mature deliberation, nor if a quarantine law will answer the purposes we all have in view. Our older citizens inform us, that this disease has never appeared in what is now comprized within the limits of the United States, but while war has raged in the West-Indies. With that cause we flatter ourselves the effect will cease—an alternative of two evils presents—wisdom directs to choose that which, under all circumstances, shall be judged the least.

Congress alone are competent to the adoption of a measure of such high import and general effect. A partial provision of the kind would only induce ruin to some particular ports, without answering the great object in contemplation. A communication of sentiments, freely and fully, becomes expedient: and it is with this view that we have been nominated a committee, by our fellow-citizens, to address ourselves to you, and ask your candid opinion upon these particulars as early as may be convenient—whether the interdiction of the commerce, or an efficient general quarantine, be most expedient: as we shall prefer our application to the general government, if the measures of interdicting the West-India commerce, during the months of July, August and September, or longer, or a general quarantine law, shall meet general approbation. On the other hand, should the measure proposed be thought improper by our neighbours and brethren of the other States, we shall endeavour to obtain such appropriate regulations for ourselves as the limited powers of a State government may enable our legislature to afford.

Subscribed by their General Committee of Citizens.

No. II.

ANSWER OF THE CITIZENS OF NEW-YORK.

To ROBERT WALN, *Esq.*

SIR, *New-York, January* 14, 1799.

WE acknowledge, with pleasure, the receipt of the letter of 3d December, 1798, subscribed by yourself and several other citizens of Philadelphia, concerning the pestilential distempers which almost annually visit some part of the territory of the United States; and we wish you to understand, that we have not answered it sooner because we deemed it necessary to take time, and consider well the important objects proposed for our contemplation.

Having no disposition to indulge controversy upon speculative points, we believe ourselves safe in affirming, that, in addition to the numerous domestic sources of poisonous exhalations existing in our cities—the foul air and the exciting cause of sickness among people so frequently brought into our ports in vessels from places beyond the sea, are not taken on board, in bulk, in foreign ports, but engendered or manufactured below and between decks, during the voyage.

It is certainly of high importance, therefore, to employ all the means with which successful discovery and experience has furnished us, to guard our cities and our ships against the destructive operation of pestilence produced locally, from accumulated impurity in both.

There can be no doubt of the extreme difficulty of providing efficient quarantine laws, while they are grounded upon the prevalent mistaken notions of the subject. It is a general rule, when legislatures construct laws upon wrong principles, that they never produce the desired effect. What good is done to a foul vessel, cargo and crew, by causing them to lay at anchor for forty, or any other number of days, during the hottest part of the year, we never could discover. On the other hand, we are well satisfied that the retention of a sickly crew, a perishing cargo, and of the unwholesome air issuing therefrom on board, are sufficient, of themselves, to produce a great part of the mischief complained of, here under our own regulations and in our own harbours. Every vessel so circumstanced is becoming hourly more foul and pestilential; and, we are persuaded, in the greater part of the cases that occur, the blame is improperly thrown upon the ports of the Mediterranean sea and the West-India islands.

Judging as we do, we have no hesitation in assuring you, though we would consent to subject our commerce to the severest regulations that the public good may require, that the necessity for interdicting it, at any season of the year, does not appear to us to

exist. The sad experience of the city of New-York proves the opinion of your older citizens to be incorrect.

After much calm consideration of the subject, we are inclined to think, as a vessel is a floating house, inhabited by human beings, and often filled with perishable things, that this habitation and store-house grows foul, and becomes unhealthy, in the same manner that a house or habitation on the land does. Animal excretions and exhalations from corrupting substances, furnish their baneful effluvia on ship-board as well as on shore; and, in the former case, by their confinement, sometimes acquire extraordinary concentration and virulence.

If this idea is just, and we really can discern no material difference in the cases, ships ought to be purified in the same manner and by the same means that are found successful in removing infection from houses. They should be unloaded without an hour's delay; the corrupted parts of the cargo thrown into the water, or destroyed by fire, and the remainder exposed to the open air and sun-shine; immediately after which, instead of relying upon a little ventilation and fumigation, both of which are feeble and inefficient means, the whole wooden work of the vessel should be washed thoroughly with strong alkaline ley, made by dissolving pot-ash, pearl-ash, kelp or barilla, in water, and not be pronounced clean, until searched and penetrated by these sweetening and neutralizing salts, which, when duly applied, never fail to prevent infection if threatened, and to destroy it if it exists—If these cannot be had, lime is a good substitute.

All cloathing, bedding, and every other thing impregnated with animal effluvia, should be made to undergo the operation of these sovereign destroyers of all foulness, or of soap, which is but a modification of some of them—with the latter, the bodies of the sick and infirm should be repeatedly cleaned.

In short, we are candid and explicit when we inform you it appears to us that, by the neglect of these necessary operations, the matter of pestilence is produced on board our ships, and by a steady, plentiful, and repeated use of them, will that mischievous agent be quelled: therefore we should be glad to co-operate with you in bringing about a general purification according to this mode, which we believe will be highly beneficial, not only in the merchant service, but in the navy.

Neat houses are cleansed many times in twelve months—ships, for obvious reasons, should be purified much more frequently. It would be a good regulation, to render a ship unfit for service unless purified as above-mentioned, at least twice a year.

Ships have generally been pronounced clean after having been fumigated. The belief of the purifying effects of smoke has been extremely deceitful and pernicious. Will fumigation with tar

or brimstone cleanse a dirty shirt or a dirty house? No. How then can it purify a foul and infected ship?

Foul, sickly and infected vessels ought to be stopped and unloaded at some distance below our cities; and a regard to the collection of the revenue will necessarily make the providing a wharf, stores, a piece of land, and inclosures for the whole, in each sea-port, a matter of federal legislation. On this point we are heartily desirous of co-operating with you in getting such regulations by law, from the National Government, as shall at once prevent the introduction of foul merchandize, and secure the property of individuals, without embarrassing the proceedings of the Custom-house. To effectuate these objects we have forwarded a memorial to Congress, and request your co-operation.—And, in certain cases, where a ship is very foul, and unfit to be admitted to the city above, but has on board bales, packages, or any thing of an uninfected or unsuspicious nature, the transportation of these from the place of purification, or the vessel detained below, to the wharves of the city, may be quickened by means of lighters and small vessels.

Committee of the Corporation of the City.
JOHN B. COLES.
GABRIEL FURMAN.
WILLIAM BAYARD.

Committee of the Medical Society.
SAMUEL L. MITCHILL.
JOHN R. B. RODGERS.
JAMES TILLARY.

Committee of the Chamber of Commerce.
CORNELIUS RAY.
MOSES ROGERS.
GULIAN VERPLANCK.

Committee of the Health-Office.
JOHN OOTHOUT.
JACOB ABRAMSE.
RICHARD BAYLEY.

THE

MEDICAL REPOSITORY.

VOL. II.—No. IV.

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ADVERTISEMENT.

THIS Number completes the ſecond volume of the MEDICAL REPOSITORY. Owing to the increaſing demand for the work, the numbers of the firſt impreſſion of the firſt volume have become ſcarce. It is, therefore, in contemplation to reprint them, that purchaſers may be accommodated with entire ſets. The ſecond volume can be had complete, either bound or in ſeparate numbers, at the ſtore of the publiſhers, No. 99 Pearl-ſtreet, New-York. The readers of the MEDICAL REPOSITORY may reſt aſſured, that the editors will ſpare no pains to make the ſucceeding numbers worthy of their peruſal. They are ſorry to learn, that ſome parcels did not arrive at their places of deſtination, particularly in Maſſachuſetts and Georgia, in due ſeaſon. Theſe delays did not ariſe from any neglect on their part, but were owing entirely to way-faring accidents. Their friends may rely on their care, to prevent, as much as poſſible, the like for the future.

New-York, May 2, 1799.

MEDICAL REPOSITORY.

VOL. II.—No. IV.

ARTICLE I.

MEDICAL ESSAYS.—No. III.

On the PESTILENTIAL DISEASES *which, at different times, appeared in the Athenian, Carthaginian, Carthaginian and Roman Armies, in the neighbourhood of Syracuse.*

By the late E. H. SMITH, *Physician.*

SYRACUSE, the most beautiful of all the cities built by the Greeks, was founded by Archias, a Corinthian, of the race of Hercules.* He first expelled the natives from Ortygia, where he commenced the city, which was afterwards extended to the neighbouring continent. This place, so celebrated in ancient history, the birth-place of Archimedes, and theatre of many memorable transactions, now reduced to a miserable town, of inferior consequence even in Sicily, is situated in north latitude 37° 5′, a little above Cape Passara (the ancient Pachynum), the south-western extremity of the island of Sicily.

The climate of Sicily, in general, is represented as favourable to health;† and, notwithstanding its insular situation, more analogous, in the qualities of temperature and humidity, to the hilly than to the atlantic divisions of South-Carolina and Georgia. The winter is remarkably mild. With the exception of a few days, it equals the finest spring weather in the north of Europe‡ and the eastern states of America; and the shade is found pleasant, in the middle of the day, even in the month of January.§ At Syracuse, in particular, the season is so little affected by the

* Cicero in Ver. act. II. lib. iv. § 117. Thucydides, B. vi.

† Eenige Berichten, &c. *i. e.* Some account of the Pruſſian, Auſtrian, and Sicilian monarchies, &c. See Monthly Review Enlarged, vol. xiv. p. 491.

‡ Swinburne's Travels in the two Sicilies, vol. ii. § 49. Dublin edit.

§ Keyſler's Travels, vol. iii. p. 33.—Tranſlation.

severities of cold and tempest, that, during its whole course, and in its most boisterous state, the sky is never totally obscured for a single day.* Yet, in this climate, did Verres, the voluptuous prætor of Sicily, that monster of atrocity and lasciviousness, so entirely seclude himself from all impact and influence of the atmosphere, as only to learn the approach of spring by observing the dew glisten on the verdure which surrounded his palace.† As the season advances, the heat rapidly increases, till, in the summer, it is no longer to be endured by strangers, and exertion, as well as enjoyment, is temporarily suspended. In autumn, the frequent rains, which are common throughout this season, and the heats of the middle of the day, contrasted with the extreme chilliness of the evenings, render it less pleasant and salubrious than any other part of the year.‡ It is to the excessive sultriness of the summers, that a late sensible writer§ ascribes the imperfection of many, and the total want of others, of the most nutritious and refreshing vegetables of the northern climates, in despite of that fertility of soil which, from time immemorial, has conferred on Sicily the appellation of the granary of Europe.

But, notwithstanding the general pleasantness and healthfulness of this island, the concurrent testimony of ancient and modern writers evinces the noxious condition of particular places. "The "least stagnant water is sufficient, in the heats of summer, to poi- "son the atmosphere: its effects on the countenances of the poor "people, who live in its vicinity, are very evident; and a stranger, "who travels through the island in this season, ought to avoid "ever passing a night near them."‖ "As soon as the sun enters "the Lion, this country becomes the house of death: fevers, of "the most malignant kind, seize upon the imprudent or unfor- "tunate wretch that spends a night near them (ponds and "marshes); and few escape with life, when attacked by so viru- "lent a disorder."¶ Instructed, probably, by experience of the calamities consequent on a near residence to marshes and stagnant waters, the inhabitants, in various parts of Sicily, have built their towns on adjoining eminences.** To avoid the dangers which

* Cicero in Ver. act. II. lib. v. § 26.

† Cicero in Ver. act. II. lib. v. § 12.

‡ Travels in Sicily and Malta, by M. de Non, p. 307, 333, and 383.—Tranſlation.

§ Eenige Berichten, &c.—"The ſoil is exceedingly fertile; but, from "the great heat of the climate, many of our moſt nouriſhing and refreſhing "vegetables will not thrive in it. Currants, raſpberries, and gooſeberries, "are unknown to the natives; and foreigners, who have attempted to cul- "tivate them, have never been able to ſucceed."

‖ Eenige Berichten, &c.

¶ Swinburne's Travels, vol. ii. § 49. Dublin edit.

** Swinburne's Travels, vol. ii. p. 309. Dublin edit.

beset the stranger in journeying through this country in the sultry and autumnal seasons, was probably one of the motives of the Roman prætors for performing the tour of the island in the time of harvest.* By a neglect of similar prudence, the celebrated M. de Non became affected with a violent fever and ague, after an incautious exposure to the heat of the sun and the chill of the evening, in an unwholesome part of the country, and in the month of September.†

From this brief account of the climate of Sicily, it will be evident, that, how favourable soever it may be esteemed, in general, to the health and longevity of the natives, and how pleasant soever many parts of it deserve to be considered, as a winter and even vernal residence for strangers; yet, in other seasons, and particularly for visitors from colder countries, it must be, in most parts, unsalutary, in others certainly fatal, and, in some, not to be long continued in, with impunity, by the inhabitants themselves. And, as this remark refers wholly to ordinary years and circumstances, it will afford some ground for estimating the effects of one of the most unhealthy situations in the country, in the sickly season of the year, with a constitution of the atmosphere favourable to epidemic diseases, on an army of foreigners, tumultuous and ill-accommodated, worn down with fatigue, or sinking in despondency.—With this reflection impressed on the mind, we may now proceed to a description of the city of Syracuse, and the country immediately adjacent, as they existed in ancient times, occasionally supplying illustrations from the accounts of modern travellers.

The once beautiful city of Syracuse consisted of five principal divisions; traces of all of which are still discernible. 1. The isle, Ortygia, Nasos or Nason: 2. Achradina: 3. Tyche or Tycha: 4. Neapolis, or the new city: and, 5. Epipolæ.‡

Ortygia, enclosed by the two ports—the great port on the west, and the little port on the east, and connected with the continent by a bridge—is of an oblong form, and about two miles in circumference.§ Here the original settlement commenced, and this was always considered as the wealthiest and most desirable part of Syracuse. It was the ancient residence of the kings; and, in the time of Cicero, still contained the house of Hiero. It was ornamented with various public buildings, particularly the temples of Diana and Minerva; and, in part, watered by the poetic foun-

* Cicero in Ver. act. II. lib. v. § 80.

† De Non's Travels, p. 383.—Tranflation.

‡ Cicero in Ver. act. II. lib. iv. § 118. De Non, p. 304. et feqüent. Swinburne, vol. ii. p. 309.

§ De Non. Swinburne.

tain of Arethusa. As the population increased, the sound which divided Ortygia from the continent was filled up, and the isle converted into a peninsula.* Carlos III. of Spain, removed the earth by which they were united; and Ortygia is again an island, and connected with the continent, as formerly, by a bridge.†

The situation of Ortygia is important; for it commands both the ports; and though supposed itself to be commanded by Achradina, yet, while that quarter of the city remained in the possession of the Syracusans, together with the isle, and the opposite promontory of Plemmyrium, the town was nearly inaccessible to a naval force.‡ At present Ortygia is the only city. To this state it was reduced by the Musselmen. It is strongly defended towards the land, weakly towards the sea-side. Its quay is small; its streets narrow, winding, and wretchedly built; and its population does not exceed 18,000 persons.§ The fountain of Arethusa, after repeated changes of situation,‖ is still discoverable in the west part of the isle; but its beauty and its honours have fled with the mythology to which it is indebted for its fame.

Achradina. The quarter of Achradina, at the period to which this essay has particular reference, was the most spacious, well built, and strongly fortified part of the city. It extends over two considerable levels, divided by a natural wall of calcareous rocks; the one as elevated as Tyche, the other, and more considerable, on a plane with Ortygia, and thence conferring on this quarter the character of the lowest division of Syracuse. The eastern part was the most commodious, and not less extensive than the modern Paris. The whole was adorned with a large forum, a beautiful portico, prytaneum, curia, and the temple of Jupiter Olympus; bordered on three sides by the sea, by the great port on the west, the lesser on the south, and the port of Trogilus on the east; and, on all sides, nearly impregnable. The rocks of this quarter of Syracuse, which are formed by marine depositions, possess the singular property of dissipating or absorbing the moisture of dead bodies so speedily, that they are preserved in vaults excavated for the purpose, in their proper form and habiliments. Achradina is remarkably fertile, and naturally adapted for bringing to perfection every tropical production.¶

Tyche, or the third city, extended northerly, from Achradina to Epipolæ; commencing at the bottom of the port of Trogilus,

* De Non. Swinburne.
† Brydone's Tour, letter xiii.
‡ De Non. Swinburne.
§ Swinburne, vol. ii. p. 311—312. De Non, p. 304.
‖ De Non, p. 307.
¶ Cicero ut antea. De Non, p. 321. et sequent. Swinburne, vol. ii. p. 313, 314, 315. Rollin's Rom. Hist. vol. v. p. 204.

which forms its south-eastern boundary. East, it was defended by a strong wall; and a wall divided it, on the west, from Neapolis. The famous gate of Hexapylon was on the eastern wall, and opposite to the little town of Leon. Tyche was ornamented by the Gymnasium; and, though now desolate, was once filled with inhabitants. It is very elevated; rising in rapid gradation from the wall of Achradina.*

Neapolis ran nearly parallel, and in the same direction with Tyche; terminating on the north, with that quarter, at Epipolæ. On the east, south, and west, it was equally protected by a wall. The upper and northern part of Neapolis, as of Tyche, was elevated; its south-western extremity was considerably lower. A noble theatre, and the temples of Ceres and Bacchus, were its most distinguished ornaments.†

Epipolæ was originally a piece of high ground without the city, and afterwards so little inhabited that it is not mentioned by Cicero, in his description of Syracuse. The most elevated situation, and commanding Tyche and Neapolis, it was judiciously inclosed by Dionysius I. who surrounded it with a wall of near four miles in extent. Its additional defence was the fortress of Labdalon, at its bottom, on the east, and that of Euryalus, at its top, on the north.‡

The whole extent of the city of Syracuse, according to Strabo, whose account is verified by the concurrent testimony of Mr. Swinburne, was equal to twenty-two miles and four furlongs, English measure.§

To this brief description of the principal divisions of this famous city it is necessary to add a few remarks relative to its immediate vicinage, and the waters by which it is surrounded.

The *great harbour* or port is about five miles in circumference, and forms, at its north-western extremity, the Gulf of Dascon. Lower down, and opposite to Ortygia, it is contracted by the promontory and fort of Plemmyrium.—The *little port*, or portus marmoreus, divides Ortygia from the continent on the east, and washes the southern wall of Achradina. The *Bay of Thapsus* runs up behind Achradina on the east, and forms, by the junction of its western extremity with the city, the *Port of Trogilus*.‖

At the distance of about two miles from Ortygia, and somewhat less than a mile and a half from Neapolis—whose western wall crossed the low grounds through which it runs—the river Anapus empties into the great harbour. This stream, which is

* Cicero. Rollin. De Non. Swinburne.
† Cicero. Rollin. De Non. Swinburne.
‡ Rollin. Swinburne. De Non.
§ Swinburne, vol. ii. p. 309.
‖ Rollin. Swinburne. De Non.

only twenty-four feet wide, and twelve or fifteen deep at its mouth, flows, in a serpentine course, through a small extent of country; which, though slightly elevated on its south or south-western side, on the north and north-west consists of an extensive marshy plain.*

Between the Anapus and the promontory of Plemmyrium, was situated the little suburb of Olympia, surrounding the scite of the ancient temple of Jupiter Olympus, built upon an eminence, and bounded on either side by the vast Lysimelian marshes, extending from the head of the great harbour, half covered with water in the vernal months, and exhaling under a vertical sun the most unwholesome and pernicious vapours.†

The preceding detail, it is hoped, will neither be found altogether tiresome, nor foreign to the purpose of this essay. Some part of it might, indeed, have been omitted, as not directly essential to the main design of the paper; but there would have been less unity in the description, and some portion of the subsequent narration might have been less perfectly comprehended.

Section II.

THE pestilential diseases prevailing in the neighbourhood of Syracuse, to which the present inquiry is limited, occurred at three distinct periods: at the three sieges of that city, by the Athenians and their allies, under Nicias; by the Carthaginians, under Imilcon; and by the Romans, under Marcellus. It is exceedingly to be regretted, that, considering the singular mortality which distinguished each of these plagues, the information concerning them is so scanty and general. But the precision which remarkably characterizes that which remains, renders it of sufficient importance to deserve particular attention. It is the purpose of the present section to place before the reader, in a succinct narration, the circumstances which the historians have preserved relative to each of these interesting events.

In the second year of the famous contest between the Syracusans and the Athenians, of which Thucydides has left so minute and so touching an account, the Athenians, whose principal encampments were on the east of Syracuse—at Leon, at Thapsus,

* Rollin. Swinburne. De Non. Thucydides, B. vi. and vii.

† Rollin. De Non. Swinburne. Watkin's Travels, letter xxiv.

The reader will find great assistance in comprehending distinctly every part of the preceding description, from consulting the plan of Syracuse in Rollin's Ancient History, or that in his Roman History, which, though inaccurate in some respects, I have reason to believe the most correct.

at Labdalium, and on the port of Trogilus—undertook the construction of a wall, which extended to Epipolæ, and was designed, after crossing the plain and the marshes of the Anapus, to reach to the great harbour on the west, and inclose the city. From the completion of this enterprize they were prevented by the exertions of the Syracusans, who carried a division wall, from the city, across the marsh, and thus opposed an insurmountable barrier to the progress of their besiegers. To promote his design, of the success of which he now began to entertain doubts, and to enable him more effectually to annoy the enemy by water, the Athenian general fortified and transported his army to Plemmyrium. From this time the fortune of the Athenians changed: their fatigue was great and incessant; every trifling success was succeeded by some sad reverse; relief was distant and uncertain; and they became a prey to despondency, not a little heightened by a sense of the injustice of their cause, their exemplary humiliation, and the unexpected superiority of their antagonists. Under these circumstances, in the autumnal season, and "encamped on marshy and unwholesome ground,"* a situation "always unhealthy for an "army, and especially in this season of the year,"† a pestilential disease shewed itself in the camp, extending with the progress of the season, and the continued exposure of the soldiery, or, as Plutarch expresses himself, by contagion; till, harrassed by the enemy on one part, and worn down by fatigue and sickness on the other, the Athenians were driven to the sad necessity of attempting a forced and secret retreat, with the dereliction of their camp, their wounded, and their sick. The consummate eloquence of Thucydides alone is adequate to the description of this scene of horrors.

Of the numbers who perished by this pestilence, and of its particular symptoms, no record is transmitted down to us. The event of this siege is known. The Athenians were surrounded on their retreat, and defeated, with immense destruction, and under the most melancholy circumstances of distress: their general, worthy of a better fate, was cruelly put to death; and the greater part of those who were made prisoners perished in Syracuse, the victims of diseases induced by excessive labour and unwholesome food. A few (in such honour was poesy among the ancients) were emancipated by the recollection and recitation of even a single verse of the pathetic tragedies of Euripides.‡

* Smith's Thucydides, vol. ii. p. 236.

† Plutarch, art. Nicias.

‡ Ibid.—For the particular history of this siege of Syracuse, the reader is referred, generally, to Thucydides, B. vi. and vii. and to the life of Nicias, by Plutarch.

At a subsequent period, and during the war between the Carthaginians and Dionysius the elder, Himilco, or Imilcon, after several successful enterprizes in other parts of Sicily, marched against Syracuse. He invaded it with an army of 300,000 foot and 3000 horse; while the Carthaginian fleet, of 200 ships, under the command of Mago, followed by 500 barks, entered the great port in a triumphal manner, and laden with the spoils of the ravaged cities of the island. Imilcon "pitched his tent in the very temple of Jupiter, then standing at Olympia; and his army encamped around him. In this situation, "an eminence "between two morasses, highly favourable for a camp, and for "rendering it impregnable," he continued thirty days, laying waste the country on all sides, plundering the temples, and demolishing the tombs of the kings, and, in vain, offering battle to the Syracusans, who had not the courage to attack or oppose him. Nature, more powerful than themselves, arrested the progress of that fate which threatened to overwhelm them. "It was now in "the midst of summer, and the heat this year was excessive." While Imilcon continued at Olympia, spreading devastation around him, and anticipated a signal revenge upon the hostile Syracusans, a pestilential malady shewed itself in his camp. It appeared first among his auxiliaries, the Africans, who, forced into the service by fear of the Carthaginians, whom they hated, were probably least carefully accommodated. From them it soon extended, by the increasing virulence and activity of the exciting cause, throughout the army. Neither cares nor medicine afforded relief. At first the sick received some assistance from the well: but the pestilence and the mortality multiplied themselves so rapidly, in every direction, that this soon became impossible; nor were there men to be found for the performance of the rites of sepulture to the accumulating dead. "Violent dysenteries, raging "fevers, burning entrails, and acute pains in every part of the "body," were the usual symptoms of this terrible disease. Some were even seized with madness; and, in their frenzy, attacked, and endeavoured to destroy, all that were exposed to their assaults. Meantime the Syracusans, in health and safety, in their elevated, dry, and airy city, watched the progress of the pestilence among their enemies, and, profiting by their forlorn condition, captured or involved in flames their mighty fleet; and, storming their camp, impregnable to the greatest force, when defended by even a small body of healthy troops, defeated them with exemplary destruction. Thus beset, enfeebled by disease and humbled by defeat, the proud Imilcon, who, a short time before, held the conquest, not only of Syracuse, but of Sicily, too cheap and easy a victory for so formidable an host, was reduced to purchase his

safety for 300 talents, and fled, leaving, unburied, the carcases of 150,000 of his soldiery.*

The history of the last of those pestilential diseases, which are particularly selected for present consideration, deserves a longer and more attentive examination. Furnishing excellent illustration of several important points in the history of these disorders, the reader will doubtless excuse such preliminary narration as may conduce to place it more fully before him.

The Roman army, under the command of Marcellus, decamped from their station at Leontium, the modern Lentini—and, arriving at Syracuse, encamped at Olympia. After an unsuccessful attempt at negociation, the city was besieged in due form; and the attack commenced on Hexapylon, by land, and on Achradina, by water. But the Roman general was not successful at Syracuse, as he had been at Leontium. All his exertions were rendered nugatory by the talents of a single citizen, and the genius of Archimedes triumphed over the power of Rome.

Necessitated to defer the further operations of the siege, the consul directed his arms against several other Sicilian cities, and struck his enemies with terror, by his brilliant atchievements.—About the same time, the Carthaginian general, Himilco, arrived at Agrigentum, to the aid of the Sicilians, with an army of 25,000 foot, 3000 horse, and twelve elephants. Hippocrates, one of the Syracusan leaders, with a part of the Syracusan troops, marched out to meet him; Epicedes having been left, with the remainder, for the defence of the city. After some skirmishes

* Rollin's Ancient History, vol. i. p. 302, 303, 304. De Non's Travels, p. 358, 359, &c. Diodorus Siculus, lib. xiv. p. 279—295.

The Carthaginians seem to have been destined to owe the defeat of many of their most promising enterprizes in Sicily to pestilential diseases.—In a former part of the same war, whose unhappy termination has been described above, Hannibal, the predecessor of Imilcon, laid siege to the city of Agrigentum (Girgenti), in the south-western part of Sicily. For the purpose of raising a wall without, which should overlook and command the city walls, he collected all the materials within his reach; and, among the rest, destroyed, and converted to this use, the tombs standing round a city very ancient and populous, and then containing 200,000 inhabitants. From the uncovering and disturbing of so many dead bodies arose a terrible pestilence, which carried off immense numbers of the Carthaginians, and the general himself. Afflicted at this dreadful mortality, the besiegers attributed it, with the superstition of the age, to the vengeance of the Gods, incensed against them for violating the repose of the dead. The healthiness of the situation, the season, and the thorough appointment and supplies of the Carthaginian army, leave no room to doubt as to the real cause of the sickness, which gradually disappeared; but two remarks of some importance are suggested by it. 1. The folly of modern nations, especially in warm climates, in suffering the interment of the dead within their cities. 2. The wisdom of some ancient nations, in having a *dead* as well as a *living town*.

with the Sicilian army, in which he was fortunate, Marcellus returned to Syracuse, whither he was soon followed by Himilco and Hippocrates, who, having formed a junction, fixed their camp at the river Anapus, about eight miles from the city. Nothing of importance occurred while the armies lay near each other. The combined chiefs soon drew off their forces; the Carthaginian general took up his winter residence at Agrigentum, and the Sicilian at Murgantia. Marcellus, who had been, for some time, busied in the interior, now again returning, appointed Crispinus to the command of the ancient camp at Olympia, and built and fortified a camp at Leon, on the eastern side of Syracuse, for himself.

The Romans commenced their operations early in the spring. Some of them having gained an entrance into Syracuse, in the night, by stratagem, the gate at Hexapylon was broken open, and Marcellus entering, secured possession of Epipolæ, before any effectual resistance could be attempted by Epicedes. Tyche and Neapolis surrendered at discretion; the fortress of Euryalus speedily submitted; and the consul disposed this part of his army, against Achradina, in three places, hoping to carry it by attack, or subdue it by famine.

While these preparations were going forward, on the part of the Romans, Himilco and Hippocrates suddenly returned to Syracuse, and encamped on the great harbour. From hence they attacked Crispinus, in the ancient camp of the Romans, while Epicedes, in concert, sallied out from the city upon the posts of Marcellus. Neither of these assaults succeeded. Crispinus repulsed the allies, and pursued them triumphantly to their station, at the same time that Marcellus compelled Epicedes to take refuge within the walls of Achradina. After this, both of the Roman commanders strengthened their encampments.

Such was the progress and state of the war, when a pestilence, common to both armies, appeared both in the camp of the allies and of Crispinus, and naturally diverted their attention from hostile operations: for the autumnal season, their unhealthy situation, and the heat (much more intolerable without than in the city), affected almost every person in either camp. At first they became sick, and died, simply from the effects of the season and the unhealthiness of their situation: afterwards, says the historian, the care and contact of the sick spread the disease; so that those who were attacked with it perished, neglected and forsaken; or their attendants fell victims to their humanity. Deaths and funerals passed before the view in rapid succession, and day and night resounded with lamentations. At length these scenes of calamity became so familiar, that they not only neither wept, nor lamented the dead, but even ceased to remove, or yet to inter them. Their

lifeless bodies lay extended in heaps, in the very sight of those who expected a similar fate; while the dead infected the sick, and the sick those who were in health, as well with fear as with the corruption and pestiferous exhalations from the bodies: so that, impatient of life, and desirous rather to fall by the sword, some singly invaded the stations of the enemy. The plague raged with far greater violence in the Carthaginian than in the Roman camp: for the Romans, from long residence in the vicinity of Syracuse, had become accustomed to the air and water. As soon as the Sicilian auxiliaries of the Carthaginians perceived that the disease spread from the insalubrity of the place, they betook themselves to their nearest cities; but the Carthaginians, admitted into no city, together with their generals, Himilco and Hippocrates, totally perished. Marcellus, observing how fast the disorder increased, drew the remainder of his troops into the city, where, under shelter, and in the shade of the houses, they regained health and vigour: notwithstanding, many of the Roman army were carried off by the same pestilence.*

Thus the Lysimelian marshes triumphed over a third army; and a number not less than 30,000 were added to those who had fallen of the soldiery of Nicias and of Imilcon. The practical consideration of these events belongs to the succeeding section.

Section III.

THE simplicity and uniformity of the preceding statements and narrative, preclude the necessity for laborious investigation and argument. The deductions to be made are unavoidably simple and uniform; but their force and tendency may be more distinctly perceived from a methodical arrangement.

I. Climate and season.—The climate of Sicily in general, and particularly of the city of Syracuse, is remarkably pleasant during a considerable part of the year. But the summers are excessively sultry; and this heat, operating on marshy situations and stagnant waters, never fails to engender malignant fevers. To these they are peculiarly liable in the summer and autumnal months. The pestilential diseases which proved so fatal to the armies of Nicias and Imilcon, and to those of the Carthaginians and the Romans, occurred either in the autumn or in the height of summer; and, in every instance, in the immediate vicinity of Syracuse.

II. Situation.—The camp of Nicias was near or at Plemmy-

* Tit. Liv. typis Barbore, 1775. tom. III. lib. xxiv. & xxv. p. 303—403.

rium, of Imilcon at Olympia, of Crispinus at Olympia also, and of Himilco and Hippocrates at the head of the great harbour. The whole of this territory is a vast marsh, but partially covered with water even in spring, extremely offensive in summer, and noted, from time immemorial, for its insalubrity.

III. Condition of the armies.—The Athenian army was in constant action, and constantly unsuccessful. The army of Imilcon was in perpetual movement, but fortunate, and full of courage. The adverse armies, at the third siege, were in a state of inaction. These are certainly considerable differences: why should they not modify the event? It may be doubted whether any moral cause would be sufficient to protect, for a long period, an unaccustomed resident in a marshy situation, from the usual consequences. Fatigue and despondency are certainly favourable to the access of disease; and inaction, particularly in camps, is generally admitted to be scarcely less so. The uncommon heat of the year of Imilcon's irruption into Sicily, may be a satisfactory explanation why his successful troops were so readily affected by the unwholesomeness of his camp.

IV. Progress of the disease.—The sick, in the army of Nicias, were not numerous at first; but the number gradually increased. This is attributed, by Plutarch, to contagion; but Thucydides, a cotemporary and more sagacious historian, expresses no such opinion, nor does it seem probable. The growing desperation of the Athenian affairs, and the tendency of the season to augment the extent and heighten the virulence of marsh exhalations, sufficiently account for the increasing predisposition to sickness, and for its more general prevalence in their army.

The same reasoning will apply, generally, to the case of Imilcon's army; but there were, in this instance, additional causes for the production of such immense mortality. The commencement of this pestilence was among his African auxiliaries. The circumstances of their impressment into the service, and of the contempt in which they were held by the Carthaginians, render it probable that less care was taken to accommodate them than the others. Some peculiar habits of body, modes of life, or varieties of native climate, might influence this event; or they might have been previously subjected to greater fatigue. Be this as it may, the sickness soon became universal, and so mortal that the dead lay unburied.—In a situation like this, there is no reason to believe that much attention was, at any time, paid to the necessary duties of cleanliness. When the sick could find no attendants, and the dead none to inter them, it requires but little sagacity to infer that no means were used for the removal of excrementitious matters. And, as a large proportion of this army were afflicted with dysentery, and the number of putrefying carcases

must have been immense, and as the limits of the camp were not very extensive, and they were now sorely pressed by a vigorous enemy, incapable themselves of resistance, and suddenly precipitated from triumph to inevitable defeat and shame, we shall find no difficulty in assigning causes sufficient and satisfactory for the extraordinary fatality of this pestilence.

The third plague commenced at the same time, in both the Carthaginian and Roman camps. At first, as in the former instance, the sick were attended to; but the number soon became so great as to render this impossible. In this case, as in the other, the dead were left unburied and to putrefy; and in this case, as in that, there is no reason to doubt but that the causes and fatality of the diseases were, in consequence, exceedingly augmented. It may reasonably be doubted, however, whether the historian is accurate in ascribing any part of the spread of the pestilence to contact of the sick. The belief of this doctrine has been of long duration and extensive prevalence; but late observations do not seem to countenance its validity. To establish it would inevitably annihilate a distinction much insisted on by the advocates for the importation of pestilential diseases into the United States; but this argument is not wanted for that purpose. It is more probable that the pestilence, in this instance, as in that preceding, was rendered more general by the increasing quantity and concentration of marsh effluvia; by the excrementitious matters in the camps, suffered to assume, unremoved, a putrescent action; and by noxious exhalations from putrefying bodies. There are no facts which authorize the opinion that a specific matter emanates from any part of the body, during pestilential or any other fevers properly so called, capable of generating a similar or a febrile disease. The most that we may venture to infer from all the facts known to us is, that the perspirable matter, like any other animal substance, when separated from the living body, or deprived of life, is liable, under certain circumstances of temperature and moisture, to undergo a putrefactive fermentation, or to go through such changes as shall adapt it for the production of febrile diseases; and this, as well when suffered to lie on the skin, as when elsewhere or otherwise disposed of. With these limitations, and in this view of the question, there need be no objection to the testimony of Livy; nor have we any ground, from a knowledge of the symptoms of the plague he describes, to oppose or fortify his narration.

V. Mortality of the pestilence.—Of the mortality of the sickness which affected the army under Nicias, we only know that it was considerable. Our knowledge is not much more definite respecting the number of the Carthaginians who perished of the army of Imilcon. There is reason, however, to believe that it far exceeded that of the Athenians; and, probably, it was not less

than 100,000 men. For it must be recollected, that many had been regularly interred in the first of the plague, and that all the sick and wounded were left behind, when their general ingloriously fled from Sicily. Nor is it probable that a number greatly exceeding 50,000 fell in the battle which preceded his flight. In the last case, our computation may be nearer the truth.—The army with which Himilco invaded Syracuse amounted to 28,000, exclusive of his Sicilian auxiliaries, and of the troops from that city, which joined him under the command of Hippocrates. The defeat of this last, by Marcellus, the preceding year; the secession of the Sicilians; and his own losses, in the various actions in which he had been previously engaged, had, no doubt, reduced his army below its original strength. But, when it is remembered that all this army perished, and that a less, but still a great, number of the Roman army also were destroyed by the plague, there is reason to estimate the whole loss as exceeding 30,000. The entire number of men sacrificed to this unhealthy situation, in three successive periods, could not be less than 150,000—a most melancholy illustration of the influence of climate, season, and soil, on the health of mankind; and an example of the activity of local causes in producing disease, compared with which, all the yellow fevers of the United States, whether originating here or imported from abroad, scarcely deserve to be remembered.

VI. Symptoms and nature of the pestilence.—On this point our information is less complete than on any other. The sickness in the Athenian army is simply called a fever, said to be contagious by Plutarch, but probably not so. Livy describes no symptoms of the plague recorded by him. Diodorus Siculus is somewhat more particular; but only so far as to mark the variety of form in which the soldiers of Imilcon were attacked by the disease. In some, in the shape of enteritis, or inflammation of the bowels; in others, of dysentery; sometimes invading as a violent fever, with acute pains in every part of the body; and sometimes with madness or delirium. Yet, even these scanty particulars are of importance, as they serve to identify the disease, and to proclaim its strict affinity to those which are the common offspring of such situations as that in which the army were encamped, and those which have spread so much apprehension, and excited so much discussion in our own country.

VII. Cessation of the pestilence.—Another circumstance which characterizes the disease under consideration, is the manner in which it was extinguished. So long as Nicias remained in his camp, he saw his men constantly dying around him, by sickness. His removal, notwithstanding the subsequent calamities which befel him, appears to have thoroughly delivered his army from fevers.

The survivors were employed as slaves in Syracuse; which could scarcely have happened had they been sick, or had the Syracusans dreaded the introduction of a contagious disease by their means. —Imilcon preserved the residue of his army only by flight. There was no other hope for their safety; and, after his return to Carthage, he exclaimed, in the bitterness of his grief, that the plague, not the enemy, had conquered him. But neither then nor before did the dry and airy city of Syracuse suffer from any sickness; nor did the fear of contagion prevent the Syracusans from repeatedly attacking the Athenian and Carthaginian camps. Their minds were probably unwarped by the bias of system, and they discerned, in the position of their enemies, the true cause of their misfortunes.—The facts related by Livy are singularly precise and important. In the first place, neither the citizens of Syracuse, nor the army of Epicedes, which had possession of Ortygia and Achradina, nor that part of the Roman army which, under the command of Marcellus, was stationed in the elevated quarters of Tyche, Neapolis and Epipolæ, were in the least affected by the plague. But this calamity was limited to the Romans, under Crispinus, in the ancient camp at Olympia; and to the allies, who were encamped at the head of the great port. Crispinus and his troops, who had lived at Olympia a considerable part of the two preceding years, or at least had remained in the vicinity of Syracuse, and had become, in a degree, habituated to the air and water, suffered less severely than their enemies; and, when the sickness became general among them, recruited, and ceased to be taken sick, in consequence of a removal to the high grounds of the city, occupied by their countrymen. The natives of the island, seeing the danger to which they were exposed, took refuge in their own cities, and escaped the disease. But the Carthaginians, without any place of refuge, and entirely unaccustomed to their situation, totally perished.

VIII. On the whole, then, it appears, that the mortality, in every instance, occurring in the armies near Syracuse, originated entirely from local causes; that there is no reason to suspect that this mortality was heightened by contagion, in the usual acceptation of that term; that the symptoms, so far as we have any account of them, were similar to those which occur, under similar circumstances, in the East and West Indies, in our own country, and in every part of the world; and that, as no difference is recorded as existing between these great epidemics or endemics, before and after the causes were increased by animal putrefaction, the advocates for the foreign derivation of pestilential diseases must relinquish the distinction between fevers from animal and vegetable putrefaction; or, if they maintain the contagious quality of the former, must admit, on equal evidence, the same quality as

characterizing the latter. To this it may be added, that as it was the universal practice of the ancients to designate any and every wide-wasting disease by the name of plague, without any special reference to its peculiar symptoms, so there is an equal propriety in our conferring the same appellation on our dysenteries and fevers; nor do these less deserve the title than the fevers of Smyrna, Cairo, and Constantinople, which resemble them in their origin, their varieties of prevalence and degree, their appearance and disappearance, and which would, in all probability, yield to the same regimen and remedies.

ARTICLE II.

On the PHLOGISTIC THEORY; *communicated in a seventh Letter from Dr.* PRIESTLEY *to Dr.* MITCHILL.

Northumberland, January 17, 1799.

DEAR SIR,

I PROMISED you one letter more on the subject of the *phlogistic theory*, and I now send it. You will find it to consist of miscellaneous articles, some of more, and others of less importance to the decision of the question that is now before the public. All the letters that I have sent you relate principally to original and recent experiments, to which I have given a good part of the leisure of the last summer; and I do not propose to do any thing more on the subject till I hear from the great authors and advocates of the theory that I combat in France; and, as we have not now any intercourse with that country, it will, probably, be a considerable time before that can be done.

I am glad, however, to find several able advocates of the system in this country; and some of them, I am confident, will do themselves honour by their candour, as well as their ability. I am pretty certain, that if due attention be given to the subject, the controversy will be decided, to general satisfaction, in a very few years. And, whenever I see reason to think that my opponents have advanced all that they can in answer to what I have done and written, I shall give an account of the impression that their observations shall have made on my mind, freely acknowledging any mistakes into which I may have fallen. But with my best endeavours to be impartial, and attentive to every fact that I have stated, I may have overlooked some important circumstances relating to them, and have reasoned inconclusively from them.

1. Inflammable air is sometimes procured when one metal is precipitated by another in its metallic state. This is a fact that is very easily explained, on the supposition that the metal precipitated does not require so much phlogiston as that which was dissolved; whereas, the doctrine of the decomposition of water cannot, as far as I see, account for the fact, at least in an easy and natural way.

When zinc is used to precipitate lead from a solution of sugar of lead, inflammable air is procured; and, according to the phlogistic theory, it ought to be so, since lead contains much less phlogiston than zinc; so that, when the former is revived by means

of the latter, it is able to furnish more than is requisite for the purpose. But if this inflammable air come from the decomposition of the water, the oxygene, which must be developed at the same time, ought to be found either in the water, or in what remains of the zinc; for it will not be pretended to be in the lead that is revived; and there are no other substances present: and yet, when I examine this water, I find it entirely free from acidity, and that it yields air much less pure than that of the atmosphere.

Iron, I also find, will yield more inflammable air by solution in acids than zinc; and a saturated solution of iron in the marine acid yields inflammable air by the solution of zinc.

2. In some of the preceding letters I gave an account of the production of inflammable air from *zinc*, by means of steam, similar to that by which the same kind of air is procured from *iron*. In this case the iron receives a great addition to its weight, which the antiphlogistians say arises from the oxygene corresponding to the hydrogene of the inflammable air; both coming from the decomposition of the water. But as the zinc gains no weight in this process, the result of the experiment appears to me to be favourable to the phlogistic theory, according to which the inflammable air comes from the metal.

This being an experiment of some consequence, I have lately repeated it, and it may be worth while to recite some of the particulars of it. Having put an ounce of zinc into an earthen tube, to which I gave a red heat, I made steam pass over it till I had procured about 300 ounce measures of inflammable air; after which I found the greatest part of the zinc reduced to a dark coloured semi-transparent glass, adhering pretty closely to the tube. I was able, however, to separate them; and I am confident that the calx did not weigh more than the metal had done; whereas, computing from the proportion of 85 parts of oxygene to 15 of hydrogene (into which it is said that water is resolvable), it will be found that it ought to have gained about 100 grains. Since, then, this great proportion of oxygene is not found, either in the calx or in the water (for this also I examined), where will the antiphlogistians say that we are to look for it? For, since the water, they say, is decomposed to furnish the inflammable air, it must be somewhere.

3. I have also repeated the experiment of the revival of red precipitate, in inflammable air, over mercury; observing, particularly, that there was neither *fixed air*, nor any sensible quantity of *water* produced, though much inflammable air disappeard. This air, therefore, must have entered into the mercury that was revived, and did not unite with any thing that was expelled from the precipitate.

4. It is said by the antiphlogistians, that spirit of nitre never becomes coloured by imbibing any thing, but always in consequence of giving out oxygene. I think, however, that the contrary is proved by its decomposing nitrous air. But the same effect is produced, though not in so remarkable a manner, by means of inflammable air. I put a quantity of dephlogisticated spirit of nitre into a phial with a ground glass stopper, with inflammable air on its surface; and, in another similar phial, atmosperical air was confined with it. Both of these phials I covered with water in inverted glass jars, to prevent their having any communication with the atmosphere. After long exposure in these circumstances, that which had the common air on its surface never acquired any colour, or only a very little, from the effect of light, transmitted through two glasses, with water between them; but that on the surface of which the inflammable air was incumbent, acquired colour very soon. I also found, on repeating the experiment, that a part of the inflammable air had been imbibed by the acid. To make this experiment, a phial, filled with the acid, must be introduced into a jar of inflammable air, and part of it being poured out, the stopper must be put into it in that situation. Other precautions must be used, which a little experience will teach.

5. I cannot help thinking that many of my experiments prove the generation of both *fixed air* and *phlogisticated air* from the same elements, viz. dephlogisticated and inflammable air, or phlogiston; whereas, the antiphlogistians say that fixed air can only be produced by the union of carbone, or charcoal, with pure air; and that phlogisticated air is a simple substance, called by them *azote*. I shall, however, mention a few more observations, which, I think, support what I have advanced on this subject.

Having made much use of a mixture of iron filings and sulphur for the purpose of phlogisticating air, I have always had a large quantity, which had been long exposed to the atmosphere, from which it is allowed that it attracts nothing besides dephlogisticated air. Of this mixture, then, quite dry and brown, $3\frac{1}{2}$ ounces, exposed to heat in an earthen tube, gave 120 ounce measures of air, of which about one-tenth was fixed air, and the rest almost wholly phlogisticated. Both these kinds of air, therefore, must consist of dephlogisticated air from the atmosphere, and something contained in the iron or sulphur, both of which are maintained to be simple substances. There remained a black powder, strongly attracted by the magnet.

6. In general, iron filings and sulphur, immersed in mercury or water, or placed in a vacuum, yield inflammable air: but, in some cases (though I do not know the reason of the difference), this mixture has yielded phlogisticated air. Having placed a

pot, containing this mixture, in a vacuum, I found, after some days, that it had yielded $2\frac{1}{2}$ ounce measures of air; and, examining it, I found it to be completely phlogisticated. I then put the same mixture under water, and, placing it near the fire, it gave an ounce measure more, all phlogisticated.

At another time, two ounce measures of air were yielded by a mixture of this kind; and, being examined long after it was formed, it was found to be wholly phlogisticated. It might, however, have been inflammable air, which had undergone that change.

7. From a quantity of calx of lead, part grey and part yellow, in a glass tube, I got about its bulk of almost pure fixed air; and the residuum extinguished a candle. Where could be the carbone in this case?

8. A solution of copper in volatile alkali gave phlogisticated air, with the marine acid; and it will not be easy to say where this azote existed before the process.

9. It is generally thought, that the fixed air contained in *fallen lime* has been attracted from the atmosphere, in which it is said to float in a loose, uncombined state. But, from no other experiment that I am acquainted with can it be proved, that any fixed air necessarily exists in the atmosphere; and lime, and lime-water, will acquire it in all situations. I am, therefore, inclined to think, that this fixed air is composed of phlogiston, imparted to the lime from the fire to which it had been exposed, and the dephlogisticated air in the atmosphere; and I have always found that a portion of atmospherical air, exposed some time to lime, or to lime-water, is sensibly less pure than before; some part of the dephlogisticated air, of which it is composed, having been taken from it by the lime; and it is never found again, except as a component part of the fixed air, which is afterwards expelled from it.

The fixed air which is expelled from the yellow calx of lead, which has been some time exposed to the atmosphere, has, I doubt not, the same source: for, when it is heated presently after it is made, little or no air can be expelled from it, as it may some time afterwards. And I find that this substance also, exposed to a portion of atmospherical air, makes it less pure than it was before, just as in the case of quick-lime.

10. That phlogisticated air is sometimes produced from the union of dephlogisticated air in the atmosphere, and phlogiston in the substances exposed to it, I think I have sufficiently proved. I shall, however, just mention another experiment, which is easily repeated, and which, I think, demonstrates the same thing. It is well known that hot charcoal imbibes any kind of air; and I have observed that, when it is afterwards put into water, it gives this air out again. But if the air be that of the atmosphere, it

takes the dephlogisticated part in preference to the other, leaving the remainder phlogisticated: and the air that it gives out after this, in water, is chiefly phlogisticated also. What, then, becomes of the dephlogisticated air that has disappeared? Will it be said that it remains in the charcoal which had imbibed it? Whence, then, came the phlogisticated air which it gave out, when, according to the new theory, charcoal does not contain any such principle? It is not found in the water into which it is put: for this gives out air less pure than it did before the process.

Before the new theory of chemistry can be unexceptionably established, the following things must be done: 1. Whenever inflammable air, or *hydrogene*, is procured, evidence must be given of the production of a due proportion of *oxygene;* i. e. 85 of this to 15 of the other: and this evidence must be something more than an addition of weight to any thing. It must be either actual *acidity*, or *dephlogisticated air*—otherwise there is no proof of the inflammable air coming from the decomposition of water. This, however, has not yet been done, with respect to iron, or any other substance by means of which inflammable air is procured.

2. When water is procured by the burning of inflammable air in dephlogisticated air, the water must not only be free from acidity, but there must be no production of *phlogisticated air* in the process: for, by the decomposition of this air, nitrous acid may be procured.

I am,
Dear Sir,
Yours sincerely,
J. PRIESTLEY.

P. S. As your publication is the only one in this country that is periodical, and comes out at reasonably short intervals, which is a circumstance of great importance to the communication of philosophical intelligence, I shall occasionally trouble you with an account of what may occur in my experimental inquiries. Medicine and general philosophy have a very near connection; and a periodical publication, purely philosophical, can hardly be expected at short intervals, in a new country like this. It will, therefore, be glad to avail itself of the support of medicine, till it be in a condition to support itself.

ARTICLE III.

On the same Subject; communicated in an eighth Letter from Dr. PRIESTLEY *to Dr.* MITCHILL.

DEAR SIR, *Northumberland, February* 1, 1799.

I INTENDED my last letter to have concluded my defence of the phlogistic system; but having lately, with another view, repeated some of my former experiments on the effect of a *continued heat;* and, among others, that of the production of sulphur from water impregnated with vitriolic acid air, it occurred to me that it would furnish an argument in favour of my hypothesis, and that it might exercise the ingenuity of my opponents to shew its consistency with theirs.

Sulphur, the antiphlogistians say, is a simple substance, and that the acid of vitriol is that substance, with the addition of pure air. Why, then, I ask, is not sulphur produced, when pure air is expelled from it by heat, rather than in the process above-mentioned? For, when this air is procured by making the acid pass through a red-hot earthen tube, no sulphur is found.

According to the phlogistic theory, the formation of sulphur from water impregnated with vitriolic acid air, is very easy, both the ingredients of which it is composed being present; viz. the basis of the vitriolic acid and phlogiston. They are only made to form a different combination by the heat, in a tube hermetically sealed: for the vitriolic acid air is produced by heating in vitriolic acid most of the metals, and any other substance, solid or liquid, that is said to contain phlogiston.

If it be said that the sulphur may be formed in my experiment, by the heat expelling the water attached to the acid, and the acid along with it, from its base, I answer, that then the water remaining in the tube should be more acid than before; whereas, I find it to be less so. This I account for from the extreme volatility of this acid. But, had the acid been that of vitriol unphlogisticated, it would have been obstinately retained by the water. Besides, it would surely be more easy to expel all acid from a liquor passing through a red-hot open tube, than from a liquor confined in a glass tube hermetically sealed, so that it cannot possibly escape, and where it is exposed to no more than a moderate degree of heat. For, had it approached to a red heat, the tube would have burst.

As, in my former experiments, I made phosphorus, as well as most of the metals, by means of the same inflammable air, whether procured from metals or any other substance, it is a proof that these substances, as well as sulphur, are compounds, and that phlogiston is the same thing in them all, and transferable from any one of them to any other, and that the metals, when deprived of it, are calces.

Having now recited a number of experiments, which appear to me to be incapable of a just explanation on the antiphlogistic theory, I wait for the remarks of my ingenious opponents, and may not, perhaps, make any reply till I can have before me all that they shall advance. When this is done, I shall either give my reasons for thinking their answers unsatisfactory, or acknowledge that they are well founded. I do not know that I have omitted to explain, as well as I could, every fact that has been urged in support of the new theory; but if my opponents will direct my attention to any others, I shall not fail to answer any questions they shall put to me with respect to them, as fully and as explicitly as I can, having, as far as I know myself, no object but the discovery of the truth.

If the experiments we appeal to be repeated with care, we shall, I doubt not, soon come to an agreement with respect to *them;* and then all that will remain will be to consider on what principles they are most naturally explained.

I am,
Dear Sir,
Yours sincerely,
J. PRIESTLEY.

P. S. As there are some things not so proper for the public eye, in my letter to you, p. 521 of the former volume, I must observe, that it was only a private letter, not intended for publication.

ARTICLE IV.

An Account of the PESTILENTIAL DISEASE *which prevailed at Boston (Massachusetts) in the Summer and Autumn of* 1798.

By SAMUEL BROWN, *M. D.*

THE first appearance of the disease was in the family of Mr. Stoddard, in Fore-street, near the market-place—June 21st. Mrs. Stoddard died on the third day after the attack. Her daughter was next sick of the disease, and died within a short time—on the second or third day. Another young woman, and a son, were, with much difficulty, recovered of the disease.

The market-place is a low, sunken part of the town. It is, from situation, the reservoir of every putrid matter, flowing in from more elevated parts of the town, and accumulated by every rain. It is surrounded with docks of stagnant waters, filled with offal and all manner of noxious matters, which, becoming putrid, throw up, at every ebb of tide, a stench very disagreeable to the adjacent inhabitants. Besides, the market-house and stalls are always supplied, in abundance, with meats of various kinds, more or less of which will always, in the hotter season of the year, be in a state of incipient putrefaction; and sometimes far advanced. This assists to destroy the salubrity of the surrounding atmosphere, by loading it with animal effluvia, perceivable by the smell, many times, at the distance of an hundred yards or more.

July 21st. Again the disease appeared, on Codman's wharf, an appendage of the market-place, and near Stoddard's wharf, where it first appeared. Seven adults successively, but in a short time of each other, took the disease—all died. For two or three weeks, all the cases of the fever were of persons either stationed in or near the market, or who often frequented this place; and I am informed, that not one of twenty, or upwards, who first took the disease, was recovered.

Fort-hill was the other part of the town where the disease was most prevalent—on the front and south-easterly part of it—extending along to Liberty-square, and on through Kelby-street to State-street. In these two parts of the town, the matter of the disease seemed to be concentrated, and thence was taken and dispersed through the town, particularly through Fore-street and State-street.

Fort-hill is very much exposed to reflected heat. The western breezes are almost entirely excluded from the south-easterly sides

of the hill; while these are so inclined as to meet the sun's rays in perpendicular direction. These parts of the hill are by far the most thickly inhabited, and were the most sickly.

It should here be observed, that, in several of the buildings near the market (I think on Codman's wharf, and other adjacent wharves), were stored green hides, and some in a high state of putrefaction; so much so, that it was with much difficulty any person could be procured to transport them. They, finally, were offered for almost nothing to any one that should undertake their removal. A person appeared, took and deposited them in a cellar on Wheeler's point, where they were soon discovered by their intolerable smell, and ordered to be removed. Accordingly, they were next carried to an opposite shore, and spread upon a point of land to dry. The person thus employed immediately sickened, and died on the third day. These are circumstances not generally known during the fever. I had them from Dr. Warren. They are since confirmed by others.

On Fort-hill likewise, hides, to the amount of between 20 and 30,000, were deposited, and, when discovered, were in a similar state as the above. Also, large quantities of spoiled and putrid beef were found in stores and cellars, in and near these places. It will be remembered that all intercourse or commerce with the French West-Indies were expressly forbidden by a law of the general government enacted for this purpose: and this might be one cause why such quantities was suffered to spoil and waste.

Some fresh fish, in one of the stalls in Kelby-street, leading from State-street to Fort-hill, were thrown into a barrel or hogshead-tub, to be prepared for pickling. In this state they were neglected for several days, the owner being away fishing. They became very putrid, and, when the owner returned, were thrown into the dock: immediately such an intolerable effluvium arose, as to drive the people in the neighbourhood from their houses and their work. The neighbourhood soon became very sickly, and many died. Several of the families I attended with Dr. Jeffries.

Some putrid beef was thrown into one of the docks by Fore-street: the smell, for a time, was intolerably offensive. Several families were suddenly and severely seized by the disease, the most of whom died.

A man was found dead in a by-place near the market, concealed by some boards and other lumber. It was judged, from the great putrefaction in which he was found, that he had lain there a week or nine days. He was so completely rotten that the muscles and limbs could be easily plucked from the body. He was discovered by the horrid effluvia which exhaled. He was supposed to have died of the fever, as he was recollected to have been seen with all the leading symptoms of the disease upon him.

It may be well further to observe, of those parts of the town where the disease seemed to originate, that they are, in situation, low, confined, crowded with buildings, and full of inhabitants; shut out from northern and western breezes, open to the south and east; exposed to the sun's heat, and this greatly increased by reflection and refraction from pavement, buildings, &c. and on Fort-hill many of the buildings are white, which makes the reflection still greater. The streets are narrow, for the most part dirty, and not unfrequently filthy.

The number dead of the disease has been stated at 250: I believe that 300 is not above the real amount. Perhaps one out of three died: but the mortality varied according to circumstances.

The fever prevailed with much malignity till about the middle of October, when it was completely checked by an inundating storm from the north-east, of three days continuance. The atmosphere was much agitated by a strong wind, and so perfectly changed and salubriated, that, after this, scarcely a case of the fever occurred. The common bilious autumnal fever succeeded, and was considerably mortal. The last weeks in November, and in this present month (December), glandular tumefactions and inflammations, sore throat, and peripneumonic affections, have been pretty numerous, and the most frequent complaints: also, at present, there is a considerable number of cases of slow putrid or typhus fever.

In obstetric cases, during the fever, there seemed to be an unusual tendency to hæmorrhage, or flooding, proving fatal to a considerable number.

With regard to the general state of the atmosphere I shall only observe, that, during the latter part of July, the whole of August, and a part of September, the weather, perhaps, was never known so uniformly and excessively hot and debilitating. The winds generally from the south, and surcharged with heat, and often with a clammy moisture. The effect upon the constitution was not unlike what is told of the sirocc wind of Sicily. "During the continuance of this wind all nature appears to languish; vegetation withers, the beasts of the field droop, the animal spirits seem to be too much exhausted to admit of the least bodily exertion, and the spring and elasticity of the air appear to be lost; the pores of the body seem at once opened, and all the fibres relaxed; the appetite destroyed, and digestion slow, difficult, and much impaired."

The common atmosphere, for the most part, was opaque and smoky, as if the earth's surface were undergoing a slow combustion. It seemed a heterogeneous mixture of particles, in a state of opposition and propulsion: respiration frequent and unrefreshing. The sun, in mid-day height, appeared as a volume

of blood, dark and angry. As it declined to the western horizon, its diameter widened greatly; and, at an hour's height, or more, was almost invisible, or shrouded as with sackcloth. These appearances, however, were not constant.

Now, what is the probable cause of this disease, or what shall we denominate the poisonous matter so calamitous in its effects on the human constitution, and which has spread desolation and death through many of the most flourishing and populous cities and towns in the union?

Dr. Mitchill, of New-York, has made several very valuable and highly ingenious communications on this subject. He asserts, that septon, or azote, simply, or in combination, and under various modifications, is this poison so deleterious in its effects. I have seen but a part of his publications, and, therefore, am not in possession of all the facts and probabilities upon which he grounds his theory; but still enough to convince me that his opinion is the most probable and the best supported of any yet started. In a private letter, he says, "The distemper arises here (New-York), as in all parts of the country, and of the world, from excessive use of the *lean* parts of animals for food, from too free drinking of spirituous liquors, from too much *septon* accumulated in the muscles and nerves, as well as from a vitiated atmosphere."

The use of the *lean* parts of animals for food is hurtful, because of the abundance of septon which they afford, and from their greater tendency to putrefy. Animal substances, says Fourcroy, differ from vegetable substances in *putrefying* more easily and more speedily, and giving out a far more noisome smell, and in yielding, when acted upon by nitric acid, much more azotic gas.—Perhaps no people in the world make so free a use of flesh food as the Americans, especially in populous towns; and this generally fresh, and sometimes considerably advanced in putrefaction. Now, let the articles designed for aliment be vitiated, and also the respiration, and disease, sooner or later, is inevitable: for, the principal reason an animal body does not putrefy when alive, is its ventilation by respiration, thereby subducting such matters as are unfriendly to the health and life of the body, and supplying such as are congenial; another reason is, the continual accession of new particles, less disposed to putrefy than the living body, supplied by the food and drink.

There are many instances upon record, of the most suddenly fatal effects from the effluvia of animal putrefaction. Thus, from the Encyclopœdia and elsewhere: The aëriform fluid which is exhaled from animal bodies in a state of putrefaction, acts, at certain times, more powerfully than at others, and is, indeed, in *one stage of the process, infinitely more noxious than any other elastic fluid yet*

discovered. Dr. St. John informs, that he knew a gentleman who, by slightly touching the intestines of a human body beginning to liberate this corrosive gas, was affected with a violent inflammation, which, in a very short time, extended up almost the entire length of his arm, producing an extensive ulcer, of the most foul and frightful appearance, which continued for several months, and reduced him to a miserable state of emaciation. He mentions, also, a celebrated professor, who was attacked with a violent inflammation of the nose and fauces, from which he, with difficulty, recovered, by stooping, for an instant, over a body which was beginning to give forth this deleterious fluid. Hence he infers, that the same gas, modified or united with others, may be the occasion of the *plague*, which has so often threatened to annihilate the human species.

In the war of 1755, in Germany, a destructive fever prevailed, attributed then to an infection of the air, by the putrid effluvia from the vast numbers killed in battle, and also to a calm in the atmosphere for a long time.

When Mr. Holwell, with 145 others, was imprisoned in the black hole at Calcutta, after passing a night in that dismal habitation, he found himself in a high putrid fever. The greatest part died before the morning.

Van Swieten was thrown into a most distressful vomiting, from inhaling the effluvia discharged from a dead dog in the highest putrefaction, which lay in a river, the bridge of which he was passing.

The fever at Philadelphia, in 1793, was ascribed to the noxious effluvia of large quantities of damaged coffee in various parts of the city, and to fomites, containing the matter of the disease, brought thither by vessels from the West-Indies, and to a vitiated state of atmosphere, as its cause.

The mortality prevailing at Newbury-port, in 1796, was ascribed, as its most probable cause and origin, to a large mass of putrid fish, which tainted the atmosphere to a considerable distance round.

Thus we have a few of the many instances of the poisonous and deleterious effects of the effluvia of animal putrefaction, under certain states of the constitution. We have also seen, that the parts of the town where the disease first made its appearance, are, from situation, much exposed to filth and putrefaction of every kind. The deposit of the hides, beef, fish, &c. which afterwards became putrid, and the circumstances attending their removal, have been noticed. We have also stated, that the mode of living, in our populous towns, is favourable to the introduction of too much septon, or azote, into the system, thereby giving a tendency to dissolution and putrefaction of the fluids; and, that the

appearances of the atmosphere were such as denoted it to abound with noxious exhalations and heterogeneous matters, and to want the elastic principle, or oxygene. From all these facts and circumstances, it is concluded, that azote, or septon, in some shape or modification, in and out of the system, is, most probably, the matter and cause of all malignant or pestilential diseases, and especially of the yellow malignant fever we have been considering.

Every one that is read in modern chemistry knows what is understood by azote, or septon, and its properties. Thus much it may be proper here to state, that azotic, or septous gas, is always found to remain, after a quantity of common air has undergone the respiration of animals, the combustion or putrefaction of bodies; because, in all these cases, the pure air, or oxygene, is absorbed or condensed. Azote, or septon, perfectly saturated with oxygene, forms pale nitric acid; with a smaller portion, it constitutes the ordinary orange-coloured fuming nitrous acid; with still less, it becomes nitrous gas; and, when wholly uncombined with oxygene, is denominated azotic, or septous gas. 32 parts of azote, and 68 of oxygene, form *nitrous air, which, of all the different species of air, from experiment, seems the most noxious to animal life.* Azote, or septon, in its simple, uncombined state, has no attraction for oxygene, but when, by the action of caloric, or the electric matter, it is brought into combination, and becomes an acid; it then strongly attracts oxygene, and continues to absorb it till perfectly saturated; and thus it is that the pure part, or oxygene, of the atmosphere, being absorbed and combined into acid matters, is made insalubrious and pestilential.

It is found, by experiment with the eudiometer, that the upper region of the atmosphere actually contains a greater proportion of oxygene, and less of azote, or septon, than nearer the surface; and, for this reason, oxygene has a stronger affinity for caloric, concentered in the sun as its fountain, and because respiration, combustion, putrefaction, and all those processes and mutations of substances which occasion the consumption of oxygene and superabundance of septon, are always on or near the earth's surface. (Vide Fourcroy, Chaptal, Gregory, &c.)

In hot seasons and climates, putrid diseases are common, because oxygene, which is the primary recipient of heat, or caloric, or caloric in its first combined or embodied state, is calorifyed and drawn up into the higher regions of the atmosphere, by which the animal system is deprived of the portion requisite for the processes of animalization. By reason of this deficiency, the carbone, hydrogene, &c. are not duly eliminated and thrown off; the azote is not duly combined, assimilated, and wrought into animal fibre. Thus the materials composing the mass of fluids become more and more heterogeneous, unrefined, and unneutralized; and thus

the constitution assumes the tendency or predisposition to putrefaction; this is also assisted by heat or caloric acting upon and pervading the system from without, which, by its great stimulation, deranges the organic motions, making the animal secretions too rapid and abundant, and often superseding them by chemical combinations and processes. Hence the propriety, in order to prevent putrefaction, of using, for food and drinks, such as are in a neutral and unforced state, and which long resist putrefaction in themselves, that the animal powers may not be too much exerted or impeded, having already suffered from the excessive stimulation of external heat. That food is undoubtedly the best which raises the least internal heat and commotion. It may also be proper to take, as preventatives, such medicines as will invigorate and consolidate the animal fibre, and, at the same time, oxygenate the system.

Active inflammations are complaints which are found to prevail in the colder seasons, and for reasons the reverse of those abovementioned; viz. because oxygene *abounds* in the atmosphere, by which it is homogenized, condensed, clarified, and rendered more elastic; and this, because it is not acted upon, and drawn into the superior regions, by the sun's perpendicular rays. Oxygene being thus concentrated, and brought nearer the surface of the earth, is absorbed by respiration, &c. in too great abundance; its agency becomes excessive; too much is embodied in the animal fibre; the vessels and organs are rendered turgid, and inflammation is the consequence. Hence the reason animal food is more coveted in winter than in summer.

Many plans have, at different times, been proposed for clarifying and preserving the purity of city atmospheres; but most of them have been either too partial and limited, or ill timed, and so reluctantly executed as that the expected good effects have not been realized. The exertions hitherto made have failed, and no barrier has yet been opposed sufficient to suppress this death-working disease. It still boldly stalks among us.

It is remarked by Dr. Mitchill, that large cities have generally been afflicted with pestilential diseases, until privies, grave-yards, and nuisances were removed, sewers constructed, and aqueducts completed.

Frequently agitating the atmosphere serves greatly to preserve its purity. Sprinkling and watering the streets and houses (but only where the sun has access) will have this effect. It will serve also to absorb and neutralize those acid particles that may have collected in the atmosphere in consequence of great heat, and by the aid of putrefaction. Docks and stagnant waters are rendered wholesome by strewing them with *caustic lime*. This was tried here (Boston) with apparent benefit. But the most certain and

effectual way to guard against disease, is a strict attention to diet and the habits of body. The matter of disease, I believe, is more frequently generated *in* than *out* of the body. A light, easy, vegetable diet is the most proper; meat highly injurious, because it corrupts the fluids, and renders them liable to putrefaction, from any slight interruption of the animal functions. Ardent spirits are pernicious. All exercise of body and mind should be temperate, orderly, and methodical. Our delights and enjoyments should be prescribed by reason and regulated by prudence, not by the extent of appetite, passion, or desire. They should enliven and invigorate, not depress and exhaust.

ARTICLE V.

A Letter to Dr. JOHN MACLEAN, *Professor of Mathematics and Natural Philosophy in Princeton College, New-Jersey, by* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, &c.*

SIR,

AS there are several assertions, in your examination of Dr. Priestley's considerations on the doctrine of phlogiston and decomposition of water, relating to some important parts of chemistry, which are absolutely erroneous, I think it necessary to call your attention to the subject.

As you wrote your dissertation expressly to prevent the youth of Princeton college from falling even into temporary delusion, and as public controversy is always favourable to the cause of truth, you can have no rational objection to this letter.

A judgment may be formed how well you have accomplished your purpose, and what right you have to condemn the experiments of Dr. Priestley in the authoritative manner you have done, having made none yourself, from the following particulars. You are not yet, Doctor, the conqueror of this veteran in philosophy.

You agree with the French chemists, that turbith mineral is an oxyde of mercury, and have asserted, that any substance into which it may be converted by a red heat, does not require any addition to constitute it a metal.

Now, the very contrary of this is true; for we have the most conclusive proofs, that turbith mineral is not an oxyde, but a sulphate of mercury.

1st. If pure turbith mineral is exposed to a red heat, in a long glass tube, a quantity of the sulphate of mercury, of a white colour and strong acrid taste, sublimes from it, and adheres to the sides of the vessel.

2dly. If a solution of caustic pot-ash is boiled upon the turbith, it suffers a considerable loss in weight, and loses its bright yellow colour, and is converted into a calx of the colour of brick-dust. The solution, by spontaneous evaporation in the open air, will yield chrystals of vitriolated tartar.

3dly. If distilled water is boiled upon the turbith, and renewed from time to time, the water will always precipitate a solution of muriated barytes.

These experiments incontestibly prove, that turbith mineral is not an oxyde, but a sulphate of mercury.

It is no objection to this opinion, that the turbith, when exposed to a red heat, yields oxygenous gas, and that running mercury is obtained; for the sulphuric acid leaves one part of it and joins to another, which sublimes in the form of a white salt. That part which the acid deserts is converted into an oxyde, is revived without addition, and yields pure air.

This sulphate of mercury is the supposed calx to which Dr. Priestley refers. It is sometimes obtained of a red colour, owing to some substance which deprives a part of the sulphuric acid of its oxygenous gas, and converts it into sulphur, which, uniting with the fluid mercury, sublimes in the form of cinnabar, and gives the whole of the salt a red colour.

This is what you ought to have ascertained, if you intended to have acquired the character of an accurate investigator.

Your next assertion is, that red lead contains more oxygene than a calx of iron, from which circumstance you suppose, that the former calx oxygenates the muriatic acid, and the latter does not, as it contains but a small quantity of pure air.

Your words are, "It certainly does not follow, because muriatic acid can separate a certain portion of oxygene from lead; when this is combined with a *great quantity* of this substance, that it should likewise separate oxygene from iron, when this is united to a comparatively *small quantity*."

You will grant, that when a pure metallic calx is heated in hydrogenous gas, that the oxygene of the calx unites to the hydrogene, and forms water; consequently, those calces which make the greatest quantity of inflammable air disappear, contain the most oxygene.

Having heated one drachm of red lead by a burning lens, eleven inches in diameter, in hydrogenous gas, obtained from the sulphuric acid, diluted with water, and malleable iron, and which had been well washed in lime-water, it made ten ounce measures of the air disappear.

One drachm of the precipitate of iron, from green vitriol by ammoniac, or a solution of mild pot-ash and the common rust of iron, heated in the same manner, made thirty-six ounce measures of the air vanish. One drachm of the filings of bar-iron, melted in oxygenous gas, absorbed twenty-six ounce measures of this air.

One hundred grains of well dried red lead, according to Lavoisier, contain 89. 93 metal, and 7. 64 oxygene; and the same quantity of the precipitate of iron, from green vitriol, by caustic pot-ash, according to Gadolin, contains 58. 48 metal, 15. 91 oxygene, 25. 39 water. One hundred parts of the yellow calx of iron, according to Lavoisier, 68. 66 metal, and 32. 34 oxygene.

Your opinion, then, according to these experiments, in regard to the quantity of oxygene which the calces of iron and lead contain, is void of foundation.

The true reason that red lead will oxygenate the muriatic acid, and that a calx of iron will not, is that the former readily gives its oxygene to the acid, and the latter does not, owing to a difference in the elective attractions subsisting between the acid, oxygene, and the two metals.

It is evident, that the oxygenation of the muriatic acid does not merely depend upon the quantity of oxygene contained in the calx; for one drachm of manganese, which has been exposed to a red heat, and parted with most of its pure air, will oxygenate the acid to a greater degree than an ounce of the calx obtained from boiling a solution of caustic alkali upon turbith mineral, which contains thirty times the quantity of oxygenous gas.

You have also declared, that Dr. Priestley is mistaken, in saying that finery cinder will not acquire rust, and assert that it contracts rust sooner than common iron.

To determine this question, a quantity of the scales which the blacksmiths strike off from red-hot iron, reduced to an impalpable powder, were exposed to the action of the air more than twelve months, and were sprinkled with water several hundred times, and, at the end of this time, were as free from rust as when first exposed.

The rust which finery cinder appears to contract is owing to iron-filings, with which it is frequently mixed. The pure scales never will acquire rust; for, when bar-iron is converted into finery cinder, it parts with the small quantity of coal it contained, and absorbs oxygene and water.

You have answered the Doctor, on this part of the controversy, by informing him, that inflammable air is a constituent part of other bodies besides water; that hydrogene is retained, with great force, by coal; that unglazed earthen vessels absorb moisture; and, lastly, you tell him in what manner the experiment ought to have been performed, and declare that it is of no value, as reported in his experiments on different kinds of air.

I have repeated this famous experiment, and the result is exactly as stated by Dr. Priestley.

One ounce of the scales of iron, and the same quantity of charcoal, were separately exposed, in two covered crucibles, in an air-furnace, well supplied with fuel, for five hours. They were then taken out of the fire, and mixed, while *red-hot*, in a *red-hot* iron mortar—were triturated with a *red-hot* iron pestle, formed of an iron ramrod—were poured upon a *red-hot* piece of sheet-iron, and instantly put into a *red-hot* gun-barrel, which was fixed in one of Lewis's black lead furnaces, and communicated with the

worm of a refrigeratory, a part of a hydropneumatic apparatus. Immediately after, luting the gun-barrel to the worm, one hundred and forty-two ounce measures of inflammable air came over in torrents, mixed with a tenth part of carbonic acid gas.

This experiment has puzzled every person to whom it has been mentioned.

For my part, I do not think it affects the antiphlogistic system; for the scales of iron contain water, and retain it in so obstinate a manner as not to part with it upon the application of heat; but when coal is added to the finery cinder, it takes away the water, by having a greater affinity to it than to the calx of iron. The coal decomposes this water; its oxygene unites to part of the coal, and forms the carbonic acid; while its hydrogene is separated, dissolves another part of the coal, and forms the carbonated hydrogene gas.

Dr. Priestley's explanation of this experiment is very unsatisfactory; for he says, the phlogiston of the charcoal contributes to revive the iron; but the Doctor ought to have remembered, that an oxyde of iron cannot be revived in one of Lewis's small black lead furnaces.

There are other substances besides finery cinder, which, when mixed with coal which has ceased to yield air, give inflammable air in large quantities. It may be obtained from any precipitate of iron or zinc, or from the flowers of zinc mixed with red-hot coal; and the hydrogene gas procured will always be in proportion to the water which the calces contain, and the metals will not be revived.

Should you consider the objections of Dr. Priestley once more, and advance nothing but what is founded upon your own experiments, you may hear from me again; and I promise not to be the first to drop the subject.

Mere assertions only serve to fix errors deeply in the mind, and do not advance the cause of truth.

Hoping that I do not intrude upon the precious moments of your time, which is "*more agreeably, and, perhaps, more usefully employed,*" than in discussing this subject,

I am, Sir, with consideration,
Yours, &c.

JAMES WOODHOUSE.

Dr. JOHN MACLEAN.

ARTICLE VI.

An Account of the Pestilential Disease which prevailed at New-London (Connecticut), in the Summer and Autumn of 1798; *communicated in a Letter from the Rev.* HENRY CHANNING *to Dr.* MITCHILL.

New-London, January 17, 1799.

SIR,

YOUR request that I would make such communications to you respecting the late pestilential disorder in this city, as might aid your researches into its origin, &c. in the United States, was communicated by Mr. Stewart, in his letter of December 19th.—I have been prevented, by the severity of the season, and many avocations, paying an earlier attention to your wishes.

I continued in the city during the prevalence of the disorder; yet, not depending entirely on my own observation during that period, I thought it adviseable to consult with gentlemen who had more extended means of information than myself. I accordingly requested Dr. Coit, Dr. James Lee, Mr. Woodman, and Mr. Holt, two members of our worthy and indefatigable committee of health, to meet, and conferred with them upon the subject.

We ascertained, with a precision to be relied on, that the whole number of persons whose complaints clearly indicated the pestilential, or, as it is called, the yellow fever, did not exceed 246: and I give it you as a very important fact, on which you may rely, that, of the above number, 231 cases were clearly traced to the spot where the sickness commenced, that is, the patients were conversant, or had been in that part of the city a few days before they were seized. The part in which the septic gas appears to have been so highly concentrated, extended sixty rods north and south, about thirty rods each way from the house first affected, and about twenty rods west, being bounded easterly on the harbour.

As we have not even a shadow of ground to suppose the disorder was not of domestic origin, we are urged critically to investigate the cause within ourselves. I confess that, at the time when my fellow-citizens began to take the alarm, I could not admit the idea, that a pestilential disorder could originate and progress in a place so happily situated as this; for, added to an elevated situation, with scarcely any low lands to generate marsh-miasma, we have a deep, spacious harbour, near the sea, from

which we are favoured with refreshing sea-breezes through the summer. And, indeed, as might be expected, this city has ever been famed for the purity of its air, and health of the inhabitants. But I have been constrained to admit, that, under the influence of summer heats, exceeding, in *intenseness* and *duration*, what has ever been experienced by the oldest inhabitants, some latent cause has been brought into action, and generated a disorder new and truly alarming.

As almost all the cases which occurred are clearly traced to a communication within the above-mentioned limits, and as scarcely a single person escaped the disorder who resided in that part of the city, there alone must we look for the cause which, under the providence of Almighty God, produced this dreadful scourge.

It appears that there was a large quantity of dried fish, in a bad state, in four or five stores, within twenty or thirty rods of each other, and all in the limits referred to. These fish were taken in the Straits of Bellisle, which being a high northern latitude, they were cured with a much less quantity of salt than usual. They were brought to this port in the autumn of 1797. The heat of the summer having been very great, many of these fish were found to be in a moist, slimy state, early in August last. From a quantity lying in bulk, in a store occupied by Mr. Jones (who fell a victim to the epidemic), a quantity of green and yellow purulent matter ran upon the floor. It was thought by the owners, that if they were spread in the sun, in the open air, the fish might be preserved; which was done, extending them a considerable distance in the street and wharves. While thus exposed to the excessive heat of the sun, with light winds, the effluvia in the neighbourhood were very offensive, as I have been informed by many gentlemen who passed in that street at the time. It was also noticed, at other times, that people were assailed with a very nauseous stench in passing through that part of the city. Whether this proceeded from the fish, or a quantity of whale-oil which was in the same store, or from the overflowing vault of an old privy, which belonged to the family first attacked, and was very offensive, I cannot ascertain.

It is to be particularly noticed, that the heat of the last summer exceeded, both in intensity and duration, what has been known within the memory of the oldest inhabitants. This excessive heat was attended with an unusually dry atmosphere, no thunder showers, light winds, and calms in the day, and calm nights, for five or six weeks successively, with the exception of a few nights. —As the degree of heat, with the prevailing state of the air, may be considered as important, in the course of your investigation, I shall subjoin my observations, taken from Fahrenheit's thermometer, placed in the open air, at the north end of the house,

about eight feet from the ground. These observations were continued to August 28th, when Mrs. Channing's illness having become very distressing, and closing in her death, September 6th, I was prevented attending further to the subject.

Before I close my letter, I would mention a particular case, which may be considered as very clearly pointing to the fish, as a principal, if not the only cause of this distressing epidemic. A captain of a coasting vessel, belonging to this place, took in about twenty quintals of the fish from three of the stores, on the 21st or 22d of August, and sailed for Hartford. He had them packed in hogsheads there, and delivered, on the 3d of September, on board a boat bound to a town in Vermont. The fish were very soft and moist, and were very disagreeable while on board the vessel. On the 8th of September, in the night, he was taken ill, and reached home on the 9th; and his illness proved a serious attack of our pestilential fever.

I have thus endeavoured to give you, in detail, all the facts of which I am possessed, which may cast some light upon the very important subject of your researches. May Heaven prosper your exertions, direct us to the means of safety, and deliver us from this pestilence, which has hitherto walked in darkness!

I am, Sir,
Your obedient servant,
HENRY CHANNING.

P. S. Dr. Coit informs me that he wrote you, before our conference, upon the subject, and mentioned, that there were only two cases which could not be traced to the limits I have mentioned. He desires me to observe, that the other cases were discovered afterwards. Yet, I would add, of those cases which we could not trace as originating in the infected spot, several were under a strong probability that this was the case.

ARTICLE VII.

Second Letter from the Rev. Mr. CHANNING, *on the same Subject, dated New-London, February* 19, 1799.

SIR,

I WROTE you the 17th of January last, and stated such facts as I conceived important in assisting your investigation of the causes of our late epidemic. I then mentioned that a very nauseous effluvium was frequently noticed in that part of this city where the epidemic began and prevailed. When I wrote, I could not ascertain, as was observed in my letter, whether this effluvium proceeded from the putrid fish, whale oil, or the overflowing vault of an old privy, belonging to the house where the first patient died. Since writing, I have more carefully examined the premises, and am satisfied that the stench proceeded from the *privy*. It was placed upon the side of a hill; on one side the vault was stoned eight feet *above ground*, on another side five feet, on the other sides the walls were enclosed by the earth. From the two sides which were above the surface of the earth, the filth oozed out constantly, and was noticed, by those who went near it, to be very offensive during the calm weather, with drought and intense heat, in August. This was, doubtless, one of the causes which rendered the air, in that part of the city, unfit for respiration. Yet I still think the *putrid fish*, in a store within one rod of the privy, and in other stores within twenty-five or thirty rods of it, were the most powerful causes in producing the deleterious effects which were experienced. In addition to what I have before communicated, I would give one or two facts, corroborating the idea, that the fish was a principal cause. Mr. Williams, of Stonington, who has been, for many years, acquainted with the state of fish, in different stages of curing, passed through the street in August, when a quantity of the fish, in the state before described, was spread, to be dried, in the open air: he remarked a very disagreeable effluvium, evidently proceeding from the fish, but very different from what he had ever observed to proceed from fish before. His health soon failed, and, for four weeks, he felt unusually affected, and was persuaded his complaint proceeded from the smell of the fish. A gentleman of this city, one of the medical profession, attending an auction where the fish were spread in the open air, was seized with nausea from the smell of the fish, and was obliged to leave the spot.

Assuredly, my dear Sir, my exalted opinion of this city, as the seat of health, gave every advantage to the opinion of foreign

origin, as the source of our late epidemic. But, looking in vain for corresponding facts, I am constrained to yield to opposing evidence. However, I am fully convinced, that, had not last summer exceeded what has ever been known before, in *long-continued* and *intense heat*, with no thunder or rain, and *light winds* and *calms*, neither the fish, in its bad state, nor any other subordinate cause, would have produced our epidemic.

I am, Sir, with sentiments of esteem,
Your obedient servant,
H. CHANNING.

Meteorological Observations, from Fahrenheit's Thermometer, in the open air, North Shade, New-London, 1798.

July 28th, at M. 92° 1 P. M. 95° 3 P. M. 88°
29th, 89
August 3, 4, 5, 6, and 7, no observation—only intense heat.
8th, at M. 89°
9th, at 10 A. M. 90° 93 3 P. M. 97° 5 P. M. 93°
10th, 90 92 2 P. M. 94 3 P. M. 92

Remark. Upon removing the thermometer within the chamber, the mercury descended from 92 to 89° in fifteen minutes, and continued descending.

August 11th, at 10 A. M. 90° M. 87° 3 P. M. 87°

Remark. The heat has been intense for a fortnight past, and has been attended with very dry weather upon this part of the coast—only one thunder-shower having occurred in the time.

August 12th, at 10 A. M. 86° M. 89° 3 P. M. 89°
13th, 85 92 87
14th and 15th, heat not so intense. In forenoon of 15th, showers without thunder.
16th, at 10 A. M. 86° M. 87° 3 P. M. 86°
17th, 85 91 87
18th, 85 87 88
19th, 80 86 89
20th, 82
21st, 87
22d, 87 84
23d and 24th, 78
25th, 88
26th, 87 92 2 P. M. 94*
27th, 80 82 3 P. M. 87
28th, 82

* At 4 P. M. 88 within doors.

ARTICLE VIII.

Additional Account of the Pestilential Fever which prevailed at New-London, (Connecticut); communicated in a Letter from Dr. COIT *to Dr.* MITCHILL, *dated New-London, January* 11, 1799.

SIR,

WINTHROP SALTONSTALL, Esq. shewed me a letter from you, requesting a particular statement of facts, relative to the origin and cause of the yellow fever which prevailed in New-London the last summer. He requested me to communicate to you my observations thereon, which I the more readily comply with, as it is my ardent wish that the cause of so fatal a disease may be investigated; and I am happy to find, that a gentleman whose medical character and abilities are so justly and universally esteemed, has undertaken it. Although personally unknown, I have perused, with pleasure, some of your medical publications, and, from them, have derived such information as was of great advantage to me in the late pestilential fever. As to its local origin, I give you the following statement of facts, and leave it with you to determine.

Capt. Elijah Bingham, inn-keeper, living in Bank-street, which is a street next to the water, on which stand several stores near said house, and in the most populous part of the city, on the 26th of August last, died, after four days sickness. The symptoms were such as gave the alarm of yellow fever. A few days after his death, his wife, son, and daughter, were seized with symptoms of yellow fever, and died.

The day on which Capt. Bingham died I was called to visit two patients, who lived directly opposite, in the same street. Within four or five days after I was called to nine other patients in the same street, not more than eight rods from said Bingham's, all of the same fever—some of them violently seized. None of these died. In other houses, not more than ten rods south of said Bingham's, eight died. About thirty rods north of said house, about the same number died.

By this time the disease had spread into various parts of the town, which occasioned the removal of two-thirds of the inhabitants. We could not find any sick of the fever (two cases excepted), but those who had been either in Bingham's house, or frequented the spot from whence we concluded the infection originated, which, from our best observation, we have fixed thirty rods north and south of Bingham's house.

We will now inquire what, within that space, could produce septic exhalations.—I have inquired of those whose business it was to examine every place where there was any collection of filth that appeared to be in a state of fermentation, and could discover nothing more within that space than in the other parts of the town, except a large quantity of imperfectly cured codfish (stored in bulk), confined in stores. In one store only, which was within fifteen yards of Bingham's house, fifty quintals were found in a state of fermentation, emitting a very disagreeable odour, part of which had been spread in the open air, round the stores and sides of the street, about eight or ten days before the appearance of the fever, after which the stores were kept shut till we had severe frost.

The above is all I can collect relative to the local origin of the fever. About a fortnight after the commencement of the fever, I was taken with it myself, and have not made any particular observations on the state of the atmosphere, &c. The Rev. Mr. Channing, who writes at this time, will give you his remarks.

I am, with esteem,
Your obedient servant,

THOMAS COIT.

ARTICLE IX.

CURSORY OBSERVATIONS ON THAT FORM OF PESTILENCE CALLED *YELLOW FEVER*.

By EDWARD MILLER, *M. D.*

THE design of the following paper, as it is simple and definite, may be comprized in a few words. It is intended to combine a number of facts relating to the operation of poisons on the animal system, to compare them with the action of febrile miasmata, and to draw such conclusions concerning the nature, prevention, and treatment of pestilential diseases, as may appear legitimately to result from the comparison. The mode of illustrating the nature of fever, by considering its remote cause as a poison, leads to an interesting train of inquiry, and furnishes a great number of instructive and luminous analogies. It is not, indeed, pretended, that this view of the subject is, in any respect, new. Many of the most enlightened physicians have long since perceived this coincidence of facts, and have, accordingly, prosecuted the comparison to a considerable extent. It only remains, therefore, at present, to inquire whether this analogy may not properly be carried still further, and whether it will not suffice to unfold a number of intricate and important circumstances of that form of pestilence which has lately produced so much distress and mortality in the United States. If this comparative view of miasmata and poisons terminated merely in speculation, however curious or unexpected many of the coincidences might appear, the publication of it would scarcely accord with the existing solemnity of the subject; but, believing that many practical inferences, respecting pestilential epidemics, may be deduced from such a comparison of facts, I have thought proper to lay it before the public, in order to be corrected or approved by my medical readers.

To prevent misapprehension, it will be proper to state, that, at present, no discussion will be undertaken concerning the origin, domestic or foreign, of pestilential epidemics; the quality of contagion attributed to them; nor the precise chemical constitution of the morbid cause. These topics, though certainly of the highest concern to our country and to all mankind, have been so ably treated in many parts of this work, that it is the less necessary now to renew the consideration of them.

Before proceeding to an account of the operation of poisons

it will be proper to state some of the causes which prevent the general acknowledgment of the analogy between them and the infectious matter of pestilence. The first which deserves to be mentioned is the gaseous and invisible state of pestilential miasmata. When poisons are spoken of, they are generally understood to mean certain visible and palpable substances, of mineral or vegetable origin, or inoculated into the system by some venomous animal. The conveyance of any of those substances into the stomach, or the bite of the venomous animal, is considered as the signal of approaching mischief. And this relation between cause and effect is usually so obvious and uniform as to be recognized even by the most careless and ignorant part of mankind. All this, however, fails in the aërial form of the noxious power producing malignant diseases, which, in a great measure, escapes the observation of the senses, and is chiefly to be known by its effects. Another cause of overlooking the analogy contended for, is the more frequent suddenness of death from poisons, produced by the largeness of the dose, which stimulates beyond the point of fever, and quickly overpowers and extinguishes the operations of the vital principle. By diminishing the quantity to an appropriate amount, these noxious substances may be made to exhibit the course, duration, and nearly all the phenomena of what is called a malignant fever. But, above all, the attention of physicians has been diverted from this analogy between miasmata and poisons, by the febrile part of the character which generally belongs to pestilential diseases, and which, in common apprehension, is constantly connected with them. Yet these diseases are by no means universally accompanied with what is strictly called fever. There is often a degree of virulence in the Asiatic plague, in the yellow fever, and in all the other forms of pestilential and malignant diseases, which altogether transcends the process of fever, and extinguishes life in a more summary manner. In the worst cases, both of poison and pestilence, the febrile part of the symptoms excites little attention. After all our researches into the nature of fever, it seems primarily to consist in the stimulation by poison, miasmata, or otherwise, of a particular part of the system, and in the propagation of morbid affection afterwards, from the viscus or part originally invaded, to the heart and arteries, and other parts of the body. If this be just, according to the theory of a celebrated writer,* fever is merely topical at first, and subsequently a disease of association. The morbid cause, how varied soever, whether contagion or miasma, whether alternation of temperature, or other noxious power operating in a similar way, appears always to act upon the same principle: it stimulates, directly or indirectly,

* Dr. Darwin.

a particular portion of the system, in a less or greater degree; sometimes to the extent of common inflammation, sometimes to inflammation *sui generis*, then to more violent inflammation verging rapidly to gangrene, and, lastly, to the extent of paralysis. The part thus variously affected, through the medium of sympathetic association, propagates disease to other parts of the system, and especially to the heart and arteries. This association may be more or less comprehensive, and thereby render the fever more simple or compound. And upon certain peculiarities of structure, or the greater or less importance of the part primarily attacked, and upon the more or less compound nature of the disease, resulting from the extent of association, will probably depend the character of the fever, as to mildness or malignancy. Examples of this may be found in cases of pneumonia and yellow fever. In the former, a local inflammation of the lungs, the effect of exposure to alternation of temperature, excites febrile action throughout the sanguiferous system: in the latter, miasmata, received, as there is commonly reason to conclude, into the stomach, first attack that important organ, and, soon afterwards, draw into morbid sympathy various parts of the head, limbs, back, &c. then the heart and arteries, and, successively, many other parts of the body. Hence it appears that fever is originally local; and though, in its progress, it be extended over the whole body, we are still to regard it chiefly as symptomatic of the stimulus applied to a particular part. If a sword penetrate the abdomen, and transfix the stomach, the range of sympathy possessed by this viscus will draw on a train of severe consequences, such as pain, inflammation, fever, convulsions, gangrene, &c. In this case the convulsions and the fever are equally symptomatic of the wound; and, by attending principally to these, and overlooking the organic injury, we should act as is common in pestilential diseases, where the force and rapidity of the action of the blood-vessels are deemed of more importance than the local poison which inflames, corrodes, or paralyses a vital organ.

After this digression, which, however, the reader will observe to be essentially connected with the business before us, it is proper to return to the operation of poisons. There can be little danger of a mistake of terms in the treatment of this subject; but, to prevent this, it may be observed, that the word poison is simply used to designate a substance which injures or destroys life by a small quantity, generally in a short time, and by a mode of action not obvious to the senses. These substances, according to their origin, are divided into mineral, vegetable, and animal; and, though much diversity will be observed in comparing them, yet there seem to be some general principles in which they all remarkably agree. To the divisions of poisons just mentioned, a fourth, viz.

the aërial, has been added; and if the opinion maintained in this paper has any foundation, the propriety of such addition will be sufficiently apparent. Indeed, according to this opinioin, miasmata are truly poisons; but, for the sake of discrimination, the usual terms of distinction will still be preserved.

Of the mineral poisons it will be only necessary to mention a few, and such as most frequently fall under notice. The oxyd of arsenic (common white arsenic), the muriate of mercury (corrosive sublimate), and the acetite of copper (verdigrise), are familiar to every body. The effects of these substances, when taken into the stomach, are nausea, vomiting, burning heat and pain referred to the stomach, sense of distension, violent griping and burning pains of the intestines, which are sometimes costive, sometimes affected with purging; the discharge of a slimy and frothy matter, often mixed with blood, by vomit and stool; insupportable thirst, pains and cramps in the limbs, pains in the back, flushing of the face, the pulse at first full, strong, and frequent: in the progress of the disease hiccup and convulsions take place, hæmorrhages appear from various sources, the violent retchings become aggravated, attended, towards the close, with vomiting of dark-coloured or black matter*—red or dark spots appear on the skin; sudden prostration of strength, weak pulse, tremblings, cold sweats and cold extremities commonly usher in death. A rapid putrefaction begins very soon after death, and renders speedy interment indispensible. Dissection discovers marks of violent inflammation and erosion of the stomach, and the collection of a large quantity of the matter of black vomiting. In cases where persons have survived the taking of poisonous doses of arsenic, the hair has been observed to fall off, and a jaundice of the worst and most obstinate kind has taken place.

The vegetable poisons are so numerous, and most of them so

* A man took, by mistake, a drachm of white arsenic instead of cream of tartar. The usual symptoms came on—thirst, heat at the stomach, vomiting, hiccup, weak, slow, and intermittent pulse; the matter puked up bilious and dark-coloured: on the fourth day he was attacked with hæmorrhagy; on the seventh he was affected with violent priapism; on the eighth he was seized with more distressing anxiety—his pulse was febrile, full, and intermittent—convulsions came on—delirium and death. On dissection, the stomach was found deprived of the villous coat, and full of a black liquor, which deposited a sediment like powdered charcoal.

See *Nosologie Methodique de Sauvages*, tome iii. p. 112.

Similar cases, especially as to black vomiting and the other more important symptoms, may be found in Wepfer (Historia Cicutæ Aquaticæ), in Morgagni (De Sed et Causis Morb.), and in many other writers.

A fatal case of poison by arsenic also occurred, some time ago, in the New-York Hospital: few of the circumstances can now be recollected; but black vomiting came on—and the patient died about the sixth day.

well known, that it is unnecessary, at present, to recount them. They produce, when taken in a given quantity into the stomach, high febrile action, heat and redness of the skin, especially of the face, neck, and breast, redness and despondency of the eyes, furred and dry tongue, anxiety and restlessness, sense of heat and sickness at stomach, vomiting, oppression and pain about the præcordia, pain in the head, giddiness and staggering, delirium, hiccup, convulsions, subsultus tendinum, dilatation of the pupils of the eyes, stupor, sometimes yellowness of the skin, hæmorrhages, black vomiting, black and pitch-like stools, &c. and after death, sometimes before, livid spots are observed on the body, the appearance of the blood is dark and dissolved, and putrefaction speedily takes place.*

The animal poisons are generally communicated by means of the bite or sting of the venomous animal. They induce a variety of phenomena which it is not necessary minutely to state. The bite of the poisonous serpents is generally followed by tumor, and livid colour of the part bitten, extravasation of dark-coloured blood into the adjacent cellular membrane, nausea and vomiting, sudden prostration of strength, paralysis of the limbs, convulsions, yellowness of the skin, hæmorrhages, &c. Livid appearances of the body, a dark-coloured and dissolved state of the blood, and a rapid putrefaction, are observed after death.†

The most transient consideration of the symptoms just recited cannot fail to impress the reader with the striking analogy between the operation of poisons and the miasmata and contagions which produce epidemic and pestilential diseases. Scarcely a single symptom belonging to malignant distempers can be mentioned, which does not also appear as a consequence of the reception of poison; and, particularly, the most deadly symptoms observed in the one form of disease, are also found to be common to the other. It may be objected that the deleterious effects of poisons are not so regularly attended with febrile appearances, as our pestilential epidemics. But, in answer to this, it should be observed, that the irregularity of malignant and pestilential diseases, with respect to the circumstances of fever, has been always remarked by the best practitioners; that the absence of the cold stage at the beginning, and of the hot stage of fever afterwards, is remarked among the signs of malignancy; and that some of the worst cases, instead of frequency of pulse and increased heat, exhibit a wonderful reduction of both. The conclusion, therefore, is, that only the lighter cases of pestilence are unlike the effects of poison; and that in proportion to the degree of malignity the resemblance grows

* See Wepfer (Historia Cicutæ Aquaticæ.)

† Fontana (Treatise of the Venom of the Viper.)

stronger. It must be admitted, indeed, that the gross matter of mineral poisons often acts upon the alimentary canal, especially in its first operations, after a manner which cannot be predicated of the subtile form of miasmata; but progressively the difference is much reduced; and, towards the close of these diseases, is nearly lost.

The morbid condition of the stomach, induced by all the mineral and vegetable poisons received into that organ, and in like manner by the miasmata of pestilence, seems to be the original source of the analogy now attempted to be established. All these noxious powers, however various in constitution and origin, concur in possessing a stimulant operation so violent as to cause inflammation, paralysis, or decomposition in this vital part. The effect of such a stimulus on the alimentary canal itself, will readily explain all the symptoms of irregular action which take place in that organ; and the sympathetic associations of the stomach with other parts will explain the affections of the head, limbs, &c. as well as the rapid exhaustion of the principle of life so often observed.

There is one remarkable phenomenon in the history of yellow fever, which seems to have no parallel but in the operation of poisons received into the stomach. I mean the retrocession of the high febrile and inflammatory symptoms of the disease, which often takes place about the third or fourth day, and leads the inexperienced observer, and the deluded patient, to confide in the hopes of recovery. If any symptom can be said to distinguish the yellow fever from other forms of pestilence, this deserves, perhaps, the most to be selected; and the cases related below, would lead to a belief, that certain mineral and vegetable poisons operate in a very similar manner.*

* A physician of this city, some time ago, was requested to visit a child, who, by mistake, had swallowed a strong solution of the muriate of mercury. Some barley-water, which happened to be at hand, was immediately given in large quantity, and the contents of the stomach were ejected, by vomiting, within four minutes after swallowing the poison. The following night the child passed a good deal of blood by vomiting and stool, succeeded by violent griping pains. On the second day these symptoms had entirely gone off; but some fever and cough (a complaint which the child laboured under before taking the poison) had returned, for which a demulcent remedy with laudanum, was ordered. On the third day the fever and cough were so severe that it was thought proper to apply a blister to the sternum. After this all complaints vanished, and the child appeared to be fast recovering. When this favourable state had continued some time, the patient began to vomit a dark-coloured matter—the pulse became more frequent, irregular, and weak—the intellectual functions were impaired—convulsions soon succeeded—a frantic delirium came on—and death took place on the fifth day.

A young woman dined upon a dish containing a poisonous species of *mushroom (Agaricus Clypeatus*, Lin?) In the afternoon she was attacked

The evidence of diſſections ſtrongly confirms the ſimilarity of the operation of poiſons and miaſmata. By theſe it appears, that in yellow fever the ſtomach and duodenum generally ſuſtain the firſt and moſt violent impreſſion of the miaſmata; that they ſuffer, by means of this ſtimulus, inflammation, paralyſis, or corroſion; and that they exhibit a deſtruction of the villous coat, and an accumulation of black matter, exactly reſembling thoſe which ariſe from the mineral poiſons.* The morbid appearances ob-

with cardialgia—in the evening ſhe felt acute pains—nauſea and vomiting came on, attended with bilious ſtools and great proſtration of ſtrength. On the ſecond day her pulſe was frequent and ſmall, and the epigaſtrium was ſwelled. Demulcent remedies, fomentations, and clyſters were ordered—many ſtools were procured, and ſeveral pieces of the muſhroom diſcharged. On the third day the cardialgia and debility continued. On the fourth day the patient was eaſy through the night—the ſkin was moiſt, and the pulſe better; and, after taking ſome further remedies, ſhe voided more of the muſhroom; the ſymptoms then abated, and ſhe ſlept. On the fifth day ſhe was ſeized with delirium, oppreſſion of the breaſt, ſighing, anxiety, &c. her pulſe failed—ſhe refuſed all remedies—her extremities became cold—the difficulty of breathing increaſed—ſhe was ſeized with locked jaw—and yellowneſs appeared on ſome parts of the ſkin. On the ſixth day the patient died. On diſſection, the ſtomach was found to be affected with inflammation, the duodenum diſtended with flatus, and the bile of the gall-bladder green and black.

See *Noſologie Methodique de Sauvages*, tome iii. p. 115.

The following caſe, related by Dr. Percival, proceeded ſo inſidiouſly as to deſerve to be mentioned here; though for the ſake of rendering it brief, much of the detail is abridged.—A young lady ate a large quantity of pickled ſamphire—this produced pain in the ſtomach and eruption on the ſkin—ſhe was affected with ſhooting pains over the body, was dejected, reſtleſs and very thirſty—her pulſe was frequent and ſmall, the tongue covered with a white fur, and ſhe paſſed ſeveral days without a ſtool—on the 6th day, vomiting came on, preceded by hiccup—on the 7th the retchings became inceſſant, and the diſcharges of a green colour and very offenſive—progreſſively the diſcharges, both by ſtool and vomiting, were more and more offenſive, and the latter aſſumed a duſky green colour—upon uſing ſome remedies the ſymptoms were ſuſpended, but in 24 hours the vomiting returned, the extremities became cold, and ſhe expired on the 10th day.—On diſſection, about a quart of brown and fetid liquor was found in the ſtomach; the internal coat of that organ was inflamed and gangrenous, particularly about the *cardia* and *pylorus*; and this appearance extended itſelf ſome way down the *duodenum*.—By the uſual chemical teſts, the pickled ſamphire was found very ſtrongly impregnated with copper.

See *Eſſays Medical, Philoſophical, and Experimental*, vol. ii. p. 122.

* The ſtomach and the beginning of the duodenum are the parts that appear moſt diſeaſed. In two perſons, who died of the diſeaſe on the fifth day, the villous membrane of the ſtomach, eſpecially about its ſmaller end, was found highly inflamed; and this inflammation extended through the pylorus into the duodenum ſome way. The inflammation here was exactly

served in other viscera, and especially the effusions of blood and serum, seem more probably to result from the general violence of arterial action; and the livid and black spots which are often discovered on the lungs and elsewhere, correspond with similar spots on the lungs of animals that die of poisons, and which are ascribed to the universally morbid state of the blood. The burning heat in the stomach, as well as the nausea and vomiting, at the attack of yellow fever, the strong traces of inflammation in that organ when laid open to view, the injuries of the villous membrane, the black matter overspreading its surface, and the extension of these morbid appearances to some distance in the duodenum, all seem to denote the presence and immediate application of *virus* to the coat of the stomach. Other circumstances also corroborate this opinion. The obstinate costiveness which appears at the beginning of the disease, the deficiency of bile in the violent cases, and, finally, the scantiness and viscidity of that liquor, discovered in dissecting the gall-bladder, must, I conceive, be attributed to excessive stimulation, and, of consequence, to a morbid degree of absorption in the alimentary canal. It may be objected to the opinion of the operation of miasmata in producing inflammation, paralysis, or corrosion in the primæ viæ, that symptoms characterising these affections do not always appear in yellow fever, and that sometimes they do not appear at all, in cases where the greatest organic destruction of the stomach had taken place. But it may be replied that nothing is more probable than fallacy on this subject. Inflammation, in the most fatal degree, may exist in the stomach without fever, pain or vomiting;* and paralysis may be produced in that organ, in a moment of time, without being perceived.† A cancerous affection of the stomach has been found, by dissection, to exist, which had never been indicated by nausea or retchings.‡

similar to that induced in the stomach by acrid poisons, as by arsenic, which we have once had an opportunity of seeing in a person destroyed by it.

See *Dissections by Drs. Physic and Cathrall*, in *Dr. Rush's Account of the Yellow Fever of* 1793, p. 120.

The internal part of the stomach and duodenum is sometimes reddish or yellow, but often blackish; the tunica villosa very easily separating, even with the touch; the other guts much in the same state: but, in general, the two first most affected. In the stomach there is often a thick mucus, with the same black stuff that is thrown up by vomit: if the villous coat is not much affected, the mucus prevails; but if otherwise, the *black vomit*. Farther down the guts, the black stuff is thicker and more viscid, almost resembling tar; and, in the great guts, it is often mixed with clotted blood.

See *Hunter's Diseases of the Army*, p. 201.

* Cullen's First Lines, vol. i. p. 205.

† Zoonomia, vol. iii. (American edition), p. 269.

‡ Duncan's Medical Commentaries, vol. iii. (2d Dec.), p. 146.

And Morgagni (Seats and Causes of Diseases, vol. iii. p. 374.) relates a case of a dose of arsenic proving fatal, where no inflammation, erosion, or other mark of mischief, appeared in the stomach; yet the poisonous material was actually found in contact with the coat of the stomach, was verified by the usual chemical and other tests, and one of its effects displayed in the appearance of livid maculæ on the skin.

Dr. De Witt, in a very judicious account of the poisonous effects of the datura stramonium (see Med. Rep. vol. ii. p. 30), has noticed the resemblance of these effects to the symptoms of malignant fevers.

The production of yellowness of the skin by certain poisonous vegetables, and by the bite of spiders, serpents, &c. (see Nosologie Methodique de Sauvages, tome iii. p. 448), as well as in malignant fevers, is a striking proof of the same analogy.

The relation which the disease produced by the bite of a rabid animal bears to malignant fevers, is ably illustrated by Dr. Rush, in his observations on the nature and cure of hydrophobia. See Medical Inquiries and Observations, vol. v.

The condition of the blood, as inspected after the operation of poisons and miasmata, affords strong evidence of the similarity of their effects. The most distinguished compilers of facts on the subject of poisons, such as Wepfer, Mead, Fontana, &c. generally represent the blood, after the system has been acted upon by mineral, vegetable, and animal poisons, as morbidly thin, dark-coloured, and indisposed to the usual manner of coagulation. That a similar state of the blood is generally found in the malignant cases of yellow fever, will not be denied. The livid maculæ and universal duskiness of the skin, the hæmorrhages from various sources, and the rapid putrefaction of dead bodies, are all common effects of miasmata and poisons: and that the latter, especially, is a common consequence of the operation of a violent stimulus, is proved by its occurrence after death by lightning, the fatigue of the chace, &c. The subject, however, of the morbid changes of the blood, has not been sufficiently explored; and may be expected, hereafter, to yield important instruction concerning the action of these noxious powers.

Flushing of the face, neck and breast, redness of the eyes, and heat in the eye-balls, are remarkable symptoms at the beginning of yellow fever. They are the usual effects of vegetable and other poisons taken into the stomach. They are observed, in a considerable degree, after taking many stimulant substances, not poisonous, into the stomach; and redness of the eyes, especially, is a well known consequence of the intoxication of opium and ardent liquors. It seems to be the effect and sign of a want of absorp-

tion in the capillary veins, induced by an exhaustion of vital power, from the operation of some excessive stimulant.

It was before stated, that a falling off of the hair has been a frequent consequence of the poison of arsenic. The occurrence of the same thing after malignant fevers, deserves to be recollected in this comparison of these diseases.

Among other consequences of an excessive dose of arsenic mentioned before, is a liableness to frequent attacks of jaundice. A gentleman, previously remarkable for his athletic powers, was nearly deprived of life by this poison, and afterwards exhibited all the appearances of a broken constitution. Soon after this misfortune he was seized with a disease of the liver, followed by paralysis; and thenceforward was subject to jaundice four or five times every year.

The analogy between the miasmata of pestilence, and mineral as well as vegetable poisons, will likewise appear interesting, if we consider the passages by which they gain admittance into the body. Three passages have been assigned for the reception of miasmata; that by the lungs in respiration—another by the cutaneous absorbents—and a third by the œsophagus and stomach. The reception by the lungs would appear probable at first view, and, from the actual approach of yellow fever under the form of catarrh in many instances, no doubt can be entertained of the fact. But though miasmata may find entrance by the lungs, and many cases of pestilence be disguised by the mask of catarrh; yet we can by no means pronounce this the usual inlet of the cause of yellow fever. The cases of primary and continued affection of the lungs, in this disease, are comparatively rare. The continuance of any single portion of air in the vesicles of the bronchia must be necessarily short; and the quick return of it, aided by the exhalation of moisture which always accompanies the act of expiration, must greatly dilute and expel any matter of infection which had obtained admittance. The noxious gas probably adheres to the vapour of water wherever they meet, and thus the *halitus* of the lungs proves to be one of the best means of defence against this aërial poison.

That miasmata are absorbed by the skin, is rendered probable by a multitude of facts. The course of inflamed lymphatics has served to trace the conveyance of a fever-producing poison from a gangrene in the lower extremities. In a similar manner an old ulcer of the leg has been often known to furnish matter of infection, which passing upwards, excited a swelling in the groin, and a consequent fever.* It is probable that the pestilence of the Levant is often communicated by cutaneous absorption, which affords

* See Hunter's Diseases of the Army, p. 186.

the best solution of the glandular swellings in that disease, and leads to the supposition, that such swellings indicate the route of miasmata into the system, rather than any critical effort of nature to discharge them. Hence may be explained the efficacy of oil applied to the skin in this kind of pestilence. The oil not only destroys such miasmata as still adhere to the skin, but, pursuing and overtaking such as have found admittance into the lymphatics, it guards the system from the mischief which otherwise might ensue. There is ground to believe, that miasmata are heavy and sluggish, that they commonly lurk near the earth, and that they are most virulent near to their source. Hence we may account for Dr. Russel's fact of inguinal swellings occurring so much oftener in the plague than the axillary, parotid, cervical, and maxillary:* hence, likewise, we may account for another fact mentioned by him, viz. that the inguinal bubo of the plague appears lower down the thigh than that of the venereal disease, and nearer to the crural vessels; and hence, finally, we may explain the appearance of pestilence in dogs, mules, and other animals holding their heads near the earth, sooner than in man. But as these glandular swellings rarely occur in yellow fever, it must be concluded, that the cause of that disease generally finds admittance into the system through some other route.

The comparative infrequency of pulmonary symptoms, as well as of buboes and carbuncles in yellow fever, compels us to seek for the route of the morbid cause in the œsophagus and stomach. If the evidence in favour of this opinion be duly considered, it will be difficult to avoid the conclusion. The first morbid sensations, at the approach of yellow fever, may be generally referred to the stomach, and to those parts with which the stomach maintains the strongest association of motions. In the progress of the disease, this organ continues to suffer far more than is usual in other malignant distempers: and, towards the close of the tragedy, black vomiting, the result of decomposition as well as of morbid secretion, and yellowness of the skin, the effect of virulence exerted on one of the nearest appendages of the stomach, furnish the two symptoms which, more than any others, have conferred on the disease its popular denominations. The miasmata of this form of pestilence, mixed with the saliva, over which the air in respiration wafts them, descend into the stomach; arrived there, they cannot be readily expelled, as from the lungs, by the alternate expulsion of air, and the envelopement of the halitus, which is incessantly discharged; but adhering to the coat of the stomach, and acting like a large dose of opium, or other violent stimulants, they speedily render the intestines costive, thereby preclude their pas-

* Treatise of the Plague, p. 113.

sage down, and then proceed to execute the remainder of their pernicious work.

Upon the whole, it results, that yellow fever is not only the offspring of a deleterious poison, but that this poison is ordinarily received into the stomach; that the great vitality and extensive associations of this viscus sympathetically induce disorder in many other vital parts of the system; that the delicacy of texture and the irritability of the stomach, combined with the activity of the poison, lead to the inflammation, or other more summary processes, by which its organization is so rapidly broken down; and that, therefore, the yellow fever, being thus primarily and essentially a disease of the alimentary canal, and chiefly of the stomach, may, perhaps, be distinguished from the Asiatic plague, besides the differences of climate, &c. by the various modes in which the miasmata are received into the body; those of the former being less admissible by the skin and more readily missible with saliva, and those of the latter being just the reverse. The few exceptions which take place in the rare occurrence of black vomiting in the plague of Asia, and of buboes and carbuncles in the yellow fever, serve rather to confirm than to weaken the force of the general observation.

If the opinions concerning yellow fever, which are here maintained, be well founded, it follows, that the principal indications of prevention and cure will be, I. To arrest the entrance of miasmata into any part of the system, but particularly into the stomach. II. As much as possible to dilute, envelope, and carry speedily through the alimentary canal, all such miasmata as may unavoidably have gained admittance into it. III. At the first approach of morbid sensations, to evacuate, as speedily and completely as possible, the contents of the stomach and intestines. And, IV. To allay the violence of stimulation, and, as far as possible, to guard against the consequences of it. The limits of this paper will not allow a discussion of all the means suited to fulfil these indications: a few remedies only will be mentioned, and these in a desultory manner.

I. As it is impossible to prevent the admission of miasmata into the lungs, while we breathe air impregnated with them, and as, when received in that manner alone, they are probably less pernicious, our principal attention should be directed to the means of excluding them from the stomach. Dr. Rand, of Boston, in his excellent paper on this disease, republished in the appendix to this number, asserts that the air, in certain parts of the town, "was so fully impregnated with contagion, as to be very perceptible to the smell and taste;" and he adds, "exciting the same sensation in my mouth, as a weak solution of corrosive sublimate of mercury, and very similar to the smell and taste of the effluvia from the con-

fluent small-pox, just after maturation; and it constantly excited in me a salivation, during my attendance upon the sick in those places. I ascribed, in some measure, my security from the disease to this effect upon the salivary glands." During the pestilence of last summer and autumn, in this city, I remarked in myself, whenever placed in infectious situations, an incessant inclination to discharge saliva by spitting; but ascribed this, probably by mistake, to my caution in avoiding to swallow it while immersed in bad air. A constant attention to this point cannot be too strongly enjoined; and, in order to increase the quantity of saliva, as well as to insure its discharge by spitting, it is always advisable, in infected places, to keep some pungent aromatic substance in the mouth. Rinsing the mouth and throat as often as may be convenient, and especially after returning from suspicious situations, as well as before eating and drinking, will always be proper. Attention to frequent ablution, and to all the circumstances of personal cleanliness, will, probably, afford sufficient guard against the absorption of miasmata from the surface.

II. This indication is of great importance. Water, the universal diluent and solvent, deserves to be relied upon for this purpose to a great extent: it should be taken copiously and frequently: and all those articles of diet in which it is a predominant part should be considered in the same light. An addition of a small quantity of any sound fermented liqour, especially porter or cyder, to the degree of rendering it more palatable and gently stimulant, will occasionally be useful. Taking animal food in the form of soup, using milk plentifully, and moderately distending the stomach with any of those liquid preparations of farinaceous substances and fruits which are easily digested, will correspond to this indication. I can scarcely express the degree of relief which I often experienced, during the prevalence of the last pestilential epidemic in this city, by the large use of these diluting and nutritious articles: they speedily removed a distressing sense of heat at the stomach, which I could ascribe to nothing but the presence of the poison of pestilence. Two advantages arise from keeping the stomach moderately filled by these liquid substances: every thing acrid is diluted; and the absorbents, fully employed in taking up what is bland and agreeable, will be more likely to reject what is unsuitable.

It is remarkable, that of those persons who are attacked with yellow fever a great majority are seized in the night, or find themselves ill on awaking in the morning. According to Dr. Fordyce, the reverse of this, and by a very large majority, is true of the cases of ordinary fevers.* Can this circumstance of yellow

* Dissertation on Simple Fever, p. 33.

fever be owing, in any measure, to the emptiness of the stomach taking place in the night, and the closer access to its coat thereby afforded to the pestilential virus?—If this conjecture have any foundation, an oily diet must be very important as a preventive of yellow fever, and especially when taken at night, just before going to bed, as, for example, a supper of salad dressed with oil. A plentiful use of butter must also be advisable on the same principle. If our opinion be true, the same advantage would result from an oily diet in stomachic pestilence, or yellow fever, which has been said to arise from the application of oil to the surface of the body, in the glandular and carbuncular pestilence of Asia.

Mountebanks and jugglers, who undertake to swallow poisons in public, in order to astonish the multitude, and to draw money from vulgar credulity, are always careful to take these poisons on a full stomach.*

In the advanced stages of yellow fever, milk is often resorted to as the only substance which can then be borne by the diseased stomach. But might it not be used habitually, and in large quantity, as a preventive, and also, in the early part of the disease, as a means of obviating future mischief? Wepfer found that milk, given to animals at the same time with some of the strongest vegetable poisons, greatly diminished their force.

But of all the means of obviating the approach of this disease, preserving regularity in the intestinal discharges is, perhaps, the most important. And, indeed, when this is completely done, it seems probable that nothing short of the most concentrated and virulent assault of miasmata will be sufficient to bring on the disease. It cannot be too deeply impressed, that the stimulus of pestilential poison, especially at the beginning of its operation, acts like an excessive dose of opium and many other stimulants, in arresting the intestinal discharge, and thereby precluding its own exit from the system.

III. But if all preventive means prove ineffectual, and symptoms of the disease be perceived to approach, it then becomes greatly interesting to do whatever may be expedient with the least possible delay. As yellow fever is here considered as the stomachic form of pestilence, produced by a poison primarily acting upon that organ, it is proper, in this case, as in other cases of poison received into the stomach, in the first place to attempt the expulsion of it. This can be best accomplished by an emetic, which, given at a proper time of the forming stage, is perfectly safe, and efficacious beyond all other remedies. The discredit attached to this remedy, in yellow fever, is owing to the postponement of it till inflammation, or some higher affection of the stomach, had came on, which

* See Wepfer (Hift. Cicut. Aquat.)

could only be thereby aggravated, and rendered more speedily fatal.

If, therefore, during the prevalence of yellow fever, a person be affected with any disorder of the stomach, head-ach, or pains of the back or limbs, with chilliness or flushing of the face, and especially if such feelings shall have been preceded by an interruption of intestinal evacuation, whiteness of the tongue, &c. he will judge wisely to take an emetic* without a moment's delay, and, as soon as the operation of that is completed, to procure a speedy and perfect unloading of the intestines. The choice of cathartics deserves attention. Such as operate expeditiously and powerfully will the sooner discharge the miasmata adhering to the intestines, and pent up by costiveness. Extraordinary virtues have been ascribed to castor oil, and probably with reason: its demulcent and enveloping, as well as cathartic power, must be important, by guarding the alimentary canal from the attack of a corrosive poison. Many of the neutral salts deserve great commendation. The tartrite of soda (Rochelle salt), the phosphate of soda, and the tartrite of pot-ash (soluble tartar), are well adapted to this purpose; and they must be especially invaluable whenever the infectious matter of pestilence is constituted with such a proportion of the principle of acidity as to become actually acid.† Injections may do much to procure a speedy solution of costiveness, particularly when they consist of so large a bulk of water, with a quan-

* In the works of Frederick, the late king of Prussia (vol. ii. p. 229.), we find the following attestation of the efficacy of emetics.

" But the ravages of war were unequal to the ravages which epidemical disease made in the hospitals. The disease we speak of was a species of inflammatory fever, accompanied with all the symptoms of the plague. The sick became delirious on the day they were attacked. Carbuncles appeared on the neck, and under the arm-pits. Whether they were or were not bled, it was the same: death carried off all those, without distinction, who were attacked by this malady; the venom of which was so virulent, its progress so rapid, and its effects so prompt, that the patient, in three days, was in the grave. Resort was ineffectually had to every kind of remedy. At length emetics were employed, and succeeded.‡ Three grains were dissolved in a measure of water: the sick were made to drink till the dose began to operate; and this was found to be a sovereign specific against the disease: for after it was brought into use scarcely three out of a hundred died. The causes of the disease, no doubt, were perspiration, impeded by cold and indigestion, occasioned by bad food. Powerful evacuations only were found effectual."

† See Dr. Mitchill's paper on soda, Med. Repository, vol. ii. p. 297.

‡ *On eut recours à l' emetique.* By this phrase the royal author probably means some preparation of antimony. [*Note of the English Transcriber.*

[*For a reference to this quotation, I am indebted to Mr.* J. W. Watkins, *of the Seneca Lake.*]

tity of mild oil and muriate of soda (common salt), as will effect a mechanical dilatation of the large intestines. For this purpose they should be administered by a large syringe, with some force, and in a continued stream, till the distension excite uneasiness. In some instances, the quantity has been carried to the extent of two gallons with advantage. In marshy countries it has been frequently observed, that remittent fevers and dysenteries often interchange their forms; one always suspending the other. In the West-Indies it has been proposed to use, by injection, a solution of the muriate of mercury (corrosive sublimate), in order to impregnate the system with that remedy. Might not a solution of this or some other active stimulant be injected into the rectum, in order to excite an artificial tenesmus and dysentery—a safer disease than yellow fever—for the purpose of diverting, by continuity of membrane, the morbid action from the stomach?

IV. The means of fulfilling this indication have already been so much the subject of discussion, that it will be less necessary now to dwell upon them. It is obvious that, when the disease assumes the tone of active inflammation, blood-letting will stand first on the list of remedies to be employed to diminish its violence. It is admitted, at the same time, that the use of this evacuation, especially in the more malignant and prostrating forms of the disease, will require the greatest caution and discernment. But, to deny altogether the admissibility of blood-letting in a state of such violent inflammation as the yellow fever often exhibits, and where dissection shews, in cases where it had been omitted, such extensive effusions of blood and serum in the lungs, brain, and other important viscera, is, in my judgment, to oppose some of the most established maxims in the practice of medicine. It is true, indeed, where a large dose of miasmata has been received into the system, and remains, for some time, undiluted and undiminished, that every hope of relief from this remedy will ultimately fail.

The efficacy of mercury deservedly places it high in the list of remedies adapted to this indication; but as the operation of it is very complex, and little understood, it would be improper, at present, to undertake the discussion.

Blisters are entitled to great confidence, especially when applied to the epigastric region for the purpose of relieving the local disease of the stomach; but they are generally resorted to at too late a period. They seem to be better adapted to obviate the incipient affection of the stomach, than to restore its exhausted powers, or to arrest the decomposition which takes place in the advanced stages.

Cold water, applied to the surface of the body by affusion or immersion, is one of the most powerful means of diminishing excessive action of the sanguiferous system in fevers. Dr. Currie,

of Liverpool, has treated this subject with so much ability and precision, that its importance in the scale of remedies is likely to be greatly augmented. He is very sanguine of its efficacy in yellow fever, and accordingly recommends it, in strong terms, to practitioners of medicine in the West-Indies and in America. In the more violent cases he prefers immersion to affusion, as being more competent to produce that great reduction of action which the exigency of the occasion requires; but in this mode of application, it is obvious, the remedy will demand the utmost attention. It is so impossible, in a few words, to do justice to his directions for the management of water, in its external and internal use, that the reader must be referred to the work itself for more complete information. As a means of carrying off heat, and of dissolving the catenation of morbid actions which forms the essence of fever, this remedy can have no superior.

The advanced stages of yellow fever, like those of other malignant diseases, often present a condition of the system not yet sufficiently investigated, and which it is a great desideratum to be able successfully to treat. This condition, besides the usual circumstances of debility and exhaustion, is distinguished by duskiness of the skin, often by livid or black maculæ, by a darker colour and thinner consistence of the blood, by tendency to hæmorrhagy, and by other signs of the scorbutic diathesis. How far the irritability of the system may immediately depend on the quantity of oxygenous matter present in it, or how far the stimulus of pestilential poison may be apt peculiarly to consume and dissipate such matter, I shall not, at present, undertake to inquire. But as this state of the body, in yellow fever, so remarkably resembles the appearances of scurvy, and as a large supply of oxygene is found to be so efficacious in the latter disease, it is surely proceeding on fair analogy to extend the remedies of scurvy to the state of the disease now in question. The efficacy of the native acids of vegetables, and particularly the citric, has been long established in the treatment of scurvy. Besides the usual modes of administering these acids, by conveying them into the stomach, perhaps some preparations of them might usefully be introduced by way of injection. And if to this be added the respiration of air, charged with an additional quantity of oxygenous gas, the force of this remedy will probably be carried to the utmost degree.

REVIEW.

ART. I. *Description of the Genesee Country, its rapidly progressive Population and Improvements; in a Series of Letters, from a Gentleman to his Friend.* Albany. *Loring Andrews and Co.* 1798. 4to. pp. 37. with a Frontispiece and two Maps.

THERE are few things on which the mind dwells with more delight than a series of improvements directly conducive to the comfort and happiness of man. The cutting of roads, the constructing of bridges, the erecting of houses, the clearing of land; in short, the rendering a wilderness habitable to the human species, is, at once, a noble and transporting theme for contemplation. The little pamphlet before us affords a most agreeable picture of the settlement and progress in cultivation, population, and the useful arts, of the tract of country in the State of New-York called Genesee. This tract, which is "bounded on the north by Lake Ontario, on the west by Niagara River and Lake Erie, on the south by the State of Pennsylvania, and on the east by the counties of Tioga and Onondaga," is an example of as rapid growth, in respect to inhabitants and industrious exertions, as any, perhaps, within the United States.

If we are right in our conjecture concerning the author,* there is good reason, from his opportunities of acquiring information, and from his candour, to entertain a favourable opinion of the statements and facts this work contains. The letters are five in number, and are written with plainness and perspicuity. Prefixed to them is an handsome perspective view of Fort Oswego, on the shore of Lake Ontario, in lat. 43° 28′ 5″ N. delineated by Mr. De Witt, the Surveyor-General of the State, and engraved by Mr. Fairman, an enterprizing and promising young artist of Albany. Subjoined to the letters are a neat and instructive map of the counties of ONTARIO and STEUBEN, within the beforementioned limits, and a map of the navigable waters of the Genesee, the Seneca, the Mohawk, the Hudson, the Susquehanna, and the Delaware, which connect this western part of New-York with Ontario and the other lakes, or inland seas, on the one side, and with the Atlantic Ocean on the other.

After this general account of the performance before us, we shall lay before our readers some extracts from it, to give a more

* C. Williamson, Esq.

particular idea of the writer's subject and manner. The first is a description of the bay and village of Sodus, on the south side of Lake Ontario. (Page 14, &c.)

"The town of Sodus is, however, making considerable improvement: a set of mills are finished, and considerable other improvements are carrying on. This place is situated on a bay of the same name, which is well known as the best harbour on the south side of Lake Ontario. Few or none exceed it, even on the sea-coast, for spaciousness and beauty. The extent of the bay, from north to south, is about six or seven miles; and, from east to west, from two to four miles. It is not above a short half mile across the entrance: the grounds around the bay rise considerably high. When the lake is agitated with a storm, the bay may be passed safely in a canoe. Vessels may anchor near the town, in twenty-five fathom water, on a sandy bottom. In many places a vessel of fifty tons might lay afloat near enough the shore to land on a plank. In this bay there are several fine islands,* covered with fine timber, which, with the head-lands stretching into the bay, afford a picturesque view from the town scarcely to be equalled. The town stands on a rising ground, on the west point of the bay, having the lake on the north, to appearance boundless as the ocean, and the bay to the east, romantically intersected with islands, and parts of the main land stretching into it. The first view of this place, after passing through a timbered country from Geneva (twenty-eight miles), strikes the eye of the beholder as one of the most magnificent landscapes human fancy can picture; and the beauty of the scene is not unfrequently heightened by the appearance of large vessels navigating the lake. At the sight of these immense bodies of water, the mind of a reflecting man must be struck with admiration at the situation of these western countries. With very trifling interruption to the navigation, they are boundless as the ocean. I was at Sodus some time ago, when a boat, with a number of families on board, put into the bay: they appeared to be French: being questioned as to their business, they said they were bound for the Spanish settlements on the Illinois River: some of them had been there the year before, and stated that, excepting the falls of Niagara, they had only a carrying-place of half a mile from lake Michigan to a branch of the Illinois River. They said they had still 1500 miles to sail. What an extensive inland navigation!

"You will find all the Genesee country abounding with situations both valuable to the farmer, and amusing to the gentleman and man of leisure: but, amongst all the variety it affords, they

* Some of these islands contain fifty acres, all of very fine soil: they will produce vegetables in great proportion, particularly onions.

must all yield to Sodus for fishing, fowling, sailing, or hunting: it stands here unrivalled; and, perhaps, no place in America can equal it. Fish of various kinds, many of them from the ocean, can be had at pleasure; and a species of green turtle may be procured in great plenty, not inferior to the green turtle brought from the West-Indies. In the spring and fall all sorts of water-fowl are innumerable in the bay. In the adjacent woods are abundance of deer. They may be easily drove into the bay, and the chace is continued by water, greatly to the amusement of those fond of such sports. Strangers, going to Sodus, will find good accommodation in a house built for the purpose. There is kept there a handsome sail-boat, and every apparatus necessary to accommodate the sportsman in pursuit of his amusement.

"The lands about Sodus are a black, sandy loam, very deep; a soil not very common in this country, but of an excellent quality for every species of cultivation: it affords the finest garden in this country."*

Another extract we make from p. 22, on the climate of Genesee, compared with that along the sea-coast.

"You will find that the climate of the Genesee country not only forms a very interesting part of its advantages, but also of its natural history; those parching heats that, on the south side of the Alleghany Mountains, seem to dry up every particle of nourishment from the plants, are never known in this country: in almost every instance a hot day is succeeded by a plentiful shower, which preserves, throughout the summer, a constant verdure: by these means our pastures and meadows are not to be excelled in the world. The nights are, in proportion, cool; and a traveller from the coast is surprized to find, in the dog days, a couple of blankets a comfortable covering. Late frosts in the spring, and early frosts in the fall, are uncommon, and almost in no instance has the fruit or corn suffered by them. The peach-trees, the great test of a climate free from severe and late spring frosts, come to great perfection. In one orchard, at an old Indian town near Geneva, the occupier of the farm sold to a neighbouring distillery, last year, 100 bushels of peaches.

"In the winters of 1796 and 1797, two gentlemen kept a regular diary of the weather; the one at Bath, in Steuben county, the other at Lancaster, in Pennsylvania: the result was, that, at Lancaster, the cold was greater than at Bath, from 11 to 13° during the winter; but the spring at Bath commences about ten days later. If more proof was necessary to establish this important fact, viz. the moderation of the climate, it might be stated, that

"* It is very common to see onions, in the gardens at Sodus, from fourteen to fifteen inches in circumference."

the settlers have, in many parts of the country, been in the custom of turning into the woods part of their cattle before winter, at a distance from their farms; and, in the spring, they have, in every instance, been found in good order, and with less loss than might be expected from the same number of cattle if kept about the houses. The frosts have never been so severe as to stop the operation of the mills, with a very trifling precaution: so remarkable was this circumstance in 1797, that a number of sleighs came from Pennsylvania to the Bath mills—a distance of seventy miles. Except in shallow places, the lakes never freeze; and the navigation of the Seneca Lake has not been impeded since the settlement of the country: this will appear the more remarkable, when frequently, within that period, the North River has been frozen at New-York, the Delaware forty miles below Philadelphia, and the Chesapeak Bay as low as Annapolis: all this is owing to the relative situation of the Genesee country. The country is bounded on the north and west by great bodies of water, which do not freeze, and in this direction there is not one mountain. The northerly and westerly winds, which scourge the coast of America, by blowing over the Alleghany Mountains late in the spring and early in the fall, covered with snow, are tempered by passing over these waters: and these mountains, to the south of us, do, at the same time, prevent the destructive effects of the southerly breeze in winter, which, by suddenly thawing the frozen wheat fields, destroys thousands of bushels. While the lakes and Alleghany Mountains are in existence, so long will the inhabitants of the Genesee country be blessed with their present temperate climate."

We make one more extract from Letter iv.

"It has very erroneously been supposed, that the face of the Genesee country was a flat, level, rich country, full of swamps and stagnant waters; when, in fact, the direct contrary is the case. The whole tract of country from Geneva to the Genesee River, with very few exceptions, is composed of a range of gentle ridges of land, running most frequently from north to south; between each a run of water, and considerable bottom land on each side. This affords the best situations imaginable for farms, each partaking of a proportion of high land and meadow. The upland, as it is termed, is timbered chiefly with hickory, oak, and walnut, and the intervale with elm, basswood, sugar-tree, &c. The stone to be found on these ridges mostly inclines to lime-stone, which is a certain indication of lands of the best quality for grain of all kinds. The openings, or large tracts of land found frequently in this country free of all timber, and shewing great signs of being once in a state of cultivation, is a singular circumstance. This sort of land, from the ignorance of the first settlers of its quality,

was supposed to be barren, and little valued: necessity, at first, obliged some to attempt the cultivation of it, and they were most agreeably disappointed to find the crops excellent, and, in several instances, have continued to reap a crop every year, for these seven years. This sort of land, which, six years ago, would not have sold for a quarter of a dollar per acre, is now reckoned cheap at ten dollars.

"It is difficult to account for these openings, or the open flats on the Genesee River, where ten thousand acres may be found in one body, not even encumbered with a bush, but covered with grass of such height, that the largest bullocks, at thirty feet from the path, will be completely hid from the view. Through all this country there are not only signs of extensive cultivation having been made at some early period, but there are found the remains of old forts, where the ditches and gates are still visible: they appear to me, in general, to be well chosen for defence: from the circumstance of swords being found in them, with French inscriptions, it is concluded that they are of French origin. I do not recollect that the French had ever so great a force in this part of America at so early a period: for these forts, from very large decayed timbers lying in them, and large timber growing over, the others falling down, must be at least two hundred years old: the forts are, besides, too numerous for mere stations; and great collections of human bones are found in them, which shews they have been occupied for many years. An examination of this part of the country, by men of observation and science, might throw some light on the history of this part of America, now so little known."

We shall conclude with the following extract from the fifth Letter, p. 35, addressed to emigrants, especially from Europe, to whom the enthusiasm of the author holds out inducements of a tempting kind.

"An European who contemplates moving to America, has a vast field before him. The United States offer a variety of soil, climate, and people: it is difficult to select from these the situations most conformable to his opinions and habits. That country where the climate requires exertion and industry to procure the comforts of life, and whose geographical situation admits of the produce of the country being easily transported to market, certainly bids fairest for having an orderly and well regulated government. The certainty of reaping a moderate profit is the only security for industry. This is very far from being the case on the western waters (Ohio, &c.) There corn, the common food of the inhabitants, is sometimes five shillings per bushel, some-

times one shilling, and every thing else in proportion.* Their distance from any large city is too far to drive fat cattle, and their climate too warm for the dairy, or to allow salting or barrelling beef, was salt to be procured. That country seems also to have a different interest from the Atlantic States. With the Genesee country these objections do not hold good: droves of fat cattle can, at any time, be sent to Philadelphia, New-York, Albany, or Baltimore. The distance is not greater than that of the best grazing countries in Massachusetts, where they have, for many years past, drove their fat cattle to the Philadelphia market. From the south part of the Genesee country cattle can, in the spring, be sent down the Susquehanna, either for the Philadelphia or Baltimore markets, as well as every other article of produce. The Onondaga salt-works being in the immediate vicinity of the Genesee country, afford salt at an easy rate for curing beef and pork, or for exportation: no country is better suited for the dairy. These are advantages to a new country which are incalculable, and afford the means of bringing thousands of acres into cultivation.

" For my own part, after having seen great part of the United States, and resided six years in the Genesee country, seen it a dreary wilderness, and seeing it now possess every comfort a man can desire, who divests himself of the foibles and follies of large cities, I must decidedly give this country the preference. With the climate of Devonshire, it is to this country as Yorkshire is to England: it is near enough to the large cities to draw a revenue from their markets, but too distant to be affected by their vices and follies. It is the only part of America calculated for the residence of gentlemen of easy fortunes I have seen. A little industry will make the roads excellent, in a country where, for sixty miles in any direction, you cannot find a mountain or a swamp, or any barren land, and thick population will give convenience and luxuries. Our vicinity with Maryland and Pennsylvania procures us the finest horses in America, and we have had the same advantage of a breed of cattle and sheep from New-England. The lakes and rivers supply us abundantly with fish, the woods with venison,† the maple-tree with sugar,‡ and our industry with excellent grain.

" * Since the army has left the Western Territory all grain has fallen in price so as not to be worth the raising, excepting for the consumption of their families, while all European goods and salt are very dear. It will take the produce of one acre to buy a pair of breeches.

" † For three several years back five hundred deer have been killed in the neighbourhood of Bath annually.

" ‡ A settlement of fifteen families, in No. 4, seventh range, made, this year, two tons of sugar from the maple-tree: some families made 500lb.

"The most convenient route for Europeans to come to this country will be to land at New-York: they will, with much ease, reach Albany by water, and from thence they can either hire waggons, or take navigation by the canals on the Mohawk River to Geneva: unless the water was in good order I would certainly prefer the land journey. A waggon, with two oxen and two horses, will go twenty miles per day with a load of 30cwt. The accommodation by the state road will be found very good, and, should any accident happen on the road, assistance can be procured at every stage. The great secret of moving with facility is to carry nothing but bedding, clothes, and cookery materials. Cabinet-makers from Scotland and London are to be found in several parts of the country: the soil producing excellent timber for furniture, which may be procured at every saw-mill, and converted into furniture for little more expence than the carriage of it would amount to from any distant part."

ART. II. *Facts and Observations relative to the Nature and Origin of the Pestilential Fever which prevailed in this City* (Philadelphia) *in* 1793, 1797, *and* 1798. By the *College of Physicians of Philadelphia. Dobson.* 1798. pp. 52. 8vo.

NOTICE was taken, in our Review, vol. i. No. 4. p. 556. of a publication then made by this medical body, concerning the prevention of the introduction and spreading of contagious diseases. The pamphlet now under consideration is very much of the same kind as the former. It contains a summary account of the proceedings of the College relative to the plague with which Philadelphia has been several times visited: and a laboured effort to prove, *that this distemper was imported from the West-Indies, and propagated by contagion.* In this nobody can entertain a doubt of the purity of their motives.

We find, however, frequent mention made of *contagion*, but no account of its constitution and nature. Great attention to *cleanliness* is recommended, and no precise mode of effecting it pointed out; and *purification of bedding and clothing*, by exposing them to *carbonic*, *sulphureous*, and *nitric acid vapours*, is advised (p. 9.), without any proof that these destroy pestilential matter; and while, at the same time, it is certain that they diminish more or less, the wholesomeness of the atmosphere with which they are mingled.

The facts exhibited appear to have been collected with great industry, and are considerably numerous: but they establish not a single new proposition. They prove nothing but what has been

believed, upon similar evidence, before. The sum of the testimony, if we rightly comprehend, is this: *Wearing apparel, ships, and some parts of their contents, bedding, and some parts of camp equipage*, do sometimes become charged with matter containing the elements of pestilence; that pestilential matter is formed therefrom in the substances, whether tents, blankets, &c. which contain its crude ingredients; in that state it is brought occasionally into the port and city of Philadelphia, and there frequently sickens and kills the persons who are exposed to it. Such is the substance of the evidence. And this is true not only of Philadelphia, but of every other place where such nasty and abominable things are brought, provided such place be hot enough and wet enough to give them activity. But it must be remembered, that similar processes, and oftentimes upon a vast scale too, are going on upon the land likewise.

Yet, if seamen and passengers are nasty, and their ships *reek with inbred poison*, this is no proof of *importation from foreign cities*. If persons exposed to these venomous exhalations are poisoned thereby, even unto death, this is no proof of specific contagion. The yellow fever has appeared in New-York during the cold weather of the late winter, in consequence of exposure to the exhalations of beef, tainted last summer, sold out since at public auction, bought by dealers in damaged provisions, and kept in chambers where the poor families who consumed it dwelt. We have sufficient evidence that the like effluvia are frequently emitted on board of vessels, both at sea and in port. Must, now, these and other facts, of the most obvious and common occurrence, be all overlooked and thrown by, to make room for the misstated notion of imported contagion?

The College admits (p. 20.) *that pestilential fevers are generated in ships*, and in such circumstances (p. 21.) as are incidental to transports and garrisons. That learned and respectable body might surely also admit, that similar materials are worked up to equal virulence in certain parts of the American cities, as they are at present regulated; where the collected excrements, &c. of a century and more underlay and contaminate the whole earth on which they stand, and, by the heat of our summers and autumns, are sometimes turned to pestilence, and exhaled into the atmosphere to poison the inhabitants.

ART. III. *Medical Inquiries and Observations, &c.* Observations upon the Nature and Cure of the Hydrophobia. By *Benjamin Rush, M. D. &c.*

(Continued from p. 312.)

THE exertions of physicians to lessen the number of incurable diseases form a splendid part of the modern history of medicine. Success has not always crowned the endeavours directed towards this object; but no effort has been wholly lost; and the improvements made, in many instances, have been such as might be sufficient to incite even the most tardy in this career of usefulness.

The terrors of hydrophobia have long held possession of the minds of men. Few instances of the successful treatment of it are to be found upon record, and even these few are supposed by many to be of dubious authority. Our learned author, therefore, has not declined any difficulty in selecting the subject of these observations.

Dr. Rush assigns the following as some of the remote and exciting causes of hydrophobia: the bite of a rabid animal—cold night air—a wound in a tendinous part—putrid and impure animal food—worms, &c. And the theory of the disease which an examination of its causes, symptoms, and accidental cures, has led him to adopt, is, that it is a *malignant state of fever*. He is induced to think so from the febrile nature of the disease in all rabid animals—from its prevalence as an epizootic, at the same time that malignant fevers are epidemic—from the resemblance between the symptoms of canine madness and malignant fevers—and from the appearances of the bodies of dogs dead of the disease, as discovered by dissection.

Dr. Rush concludes, that the disease produced in the human body, by the bite of a rabid animal, is of the nature of a malignant fever—from its symptoms—from its appearing, like a malignant fever, at different intervals after the time of receiving the infection—from the similarity of the appearances of the blood when drawn in both cases—from the agreement of the diseases in point of duration—from the equally rapid putrefaction of bodies dead of either disease—and from the sameness of appearances in the dead bodies upon dissection.

The remedies for hydrophobia are divided by our author into two kinds: 1. Such as are proper to prevent the disease, after the infection of the rabid animal is received into the body. 2. Such as are proper to cure it when formed.—Under the former head of remedies, he mentions cutting or burning out the wound-

ed part—long and frequent affusion of water—and keeping the wound open and running for several months. He recommends low diet as a means of prevention, and supporting the spirits and confidence of the patient; but he does not rely upon mercury for this purpose, as the disease has been known to come on, notwithstanding a salivation.

As soon as the disease is discovered, Dr. Rush urges the use of blood-letting as the principal remedy, and advises that the quantity drawn be very copious. Many instances are adduced of the bold employment of this remedy with success. Besides blood-letting he recommends purges and clysters, sweating, and salivation by mercury. He also mentions cases where musk and opium, bark and wine, have been found efficacious remedies. Blisters and stimulating cataplasms, he supposes, may be useful in the decline of this disease, as they are in that of malignant fevers. The cold bath, also long immersion in cold water, have produced beneficial effects.

The analogy between hydrophobia and malignant fevers, which is so ably supported by Dr. Rush, in these observations, seems to be founded upon a just survey of the action of poisons upon the animal system. However various the substances called poisons may be, in respect either of their constitution or the effects they may occasionally produce, we are well persuaded they all hold many principles in common, and that a multitude of them attack animal life in a mode essentially the same.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

A LYING-IN WARD has been established in the Almshouse of the City of New-York. The cases which occur there are numerous enough to answer the purpose of public instruction. Accordingly, there is delivered a course of lectures on the obstetric art, including the anatomical, physiological, and practical parts, by *Valentine Seaman*, M. D. As this establishment is particularly and exclusively devoted to the education of *females*, it will be easy for *women* who practise, or intend to practise midwifery, to avail themselves of the excellent opportunities which are hereby held out to them.

Extract of a Letter from Dr. Nooth, Superintendant-General of the Hospitals in British America, to Dr. Mitchill, dated Quebec, Jan. 24, 1799.

"I can assure you I am almost convinced of the truth of your doctrine with regard to azote, or septon, as the cause of those epidemic diseases that generally make their appearance toward the end of summer in warm countries. There are some observations which I have made in my own practice, that lead me to suppose there may be *something of an acid nature*, that may act as an exciting cause, in the dysentery and yellow fever, and, indeed, in many other diseases that arise from heat and other circumstances, in the latter months of the warm season. Having unfortunately seen, in the course of my practice, a great number of dysenteric cases, and having experienced the inefficacy, in general, of the usual mode of practice, I was induced to try the effects of the several purgatives now in use, with the view of ascertaining how far any one was preferable to the others in the treatment of dysenteric patients. Experience soon taught me, that the *tartarum solubile* (neutralized tartrite of pot-ash) was the most salutary in its effects, and, of course, I have always, since that discovery, had recourse to it, in dysenteries and other autumnal diseases, and, I can assure you, with the greatest success, both in children and adults. The component parts of that neutral (acid of tartar and pot-ash), and the advantages attending its use in the above cases, seem to confirm your doctrine, and induce me to believe your theory is better founded than the world will, perhaps, at first, allow."

Extract of a Letter from a learned Correspondent in Germany, to Dr. Mitchill, dated Sept. 15, 1798.

"Our literature in Germany is much turned to politics: this causes the other sciences to be somewhat stationary. The KANTIAN philosophy is an exception, but I hope it will not last long. I confess that the author of this new scholastic system of metaphysical subtleties is a man of great genius and penetration, but his philosophy is quite unintelligible to those who cannot make a study of it their whole life; and his disciples, especially one FUHTE, at Jena, are quite obscure. But KANT's sectaries say themselves, that to understand his fundamental propositions, one can only be 'enabled by *guessing*, and that to find the evidence thereof is *only* a case of *accident*, even for those who are endowed with the *greatest philosophical genius*.' Such are the words of one of those KANTIAN philosophers, who write the most plain—Mr. REINHOLD, Professor at Kiel. You cannot imagine what strange progress this philosophy (which demonstrates all *à priori*, and admits no knowledge of *à posteriori*, in philosophical matters) has made. All is infected thereby. We have theological and chemical treatises written in a jargon the most ridiculous: but it begins to abate. Mr. NICOLAI, a learned bookseller at Berlin, has written an excellent satirical novel, called GUNDIBERT, in which the principal hero is a KANTIAN PHILOSOPHER."

Extract of a Letter from an eminent Character in Montpellier, to Dr. Mitchill, dated August 20, 1798.

"I cannot forego the pleasure of writing to you from this place, after having seen all the physicians, and taken notice of the NATIONAL SCHOOL OF PHYSIC, or *l'Ecole de Santè*. All is well organized, and I am well pleased with the instruction. There are about six hundred students. The professors are

Médecine légale. Medical Jurisprudence.	G. J. RENE, *Directeur* (Director.)
Physiologie et Anatomie. Physiology and Anatomy.	C. L. DUMAS. . . . .
Chimie. Chemistry.	J. A. CHAPTAL. . . . .
Matière Médicale et Botanique. Materia Medica and Botany.	A. GOUAN. J. N. BERTHE.
Pathologie. Pathology.	J. B. T. BAUMES. P. LAFABRIE.
Médecine opérante. Surgery.	A. L. MONTABRE. V. BROUSSONET.

Clinique interne. Clinical Practice of Medicine.	H. FOUQUET. J. PETIOT.
Clinique externe. Clinical Practice of Surgery.	J. POUTINGON. A. MEJAN.
Accouchemens, Maladies des Femmes, Education Physique des Enfans. Midwifery, Female Diseases, and Management of Infants.	J. SENEAUX. J. M. J. VIGAROUX.
Démonstration des Drogues usuelles. Demonstration of Drugs, &c. in common use.	J. G. VIRENQUE, *Conservateur* (Keeper.)

"I have made them acquainted with your Nomenclature, the state of learning in Columbia College, and convinced them that sciences are more cultivated in the United States than Europeans generally imagine. I particularly called their attention to your very interesting letter to Thomas Percival, of Manchester, concerning *the use of alkaline remedies in fevers, and the analogy between septic acid and other poisons*, inserted in the Medical Repository. It has been extremely acceptable to them in every respect, and especially on account of the justice you have done to a member of their old school, RIVERIUS, concerning the mixture of calomel and jalap, which is actually far from being a new composition, as is generally thought all over the United States. I intend to translate some of your works," &c.

Mr. HUMBOLD, who has distinguished himself by many new and surprizing experiments on GALVANISM, or metallic irritability, intends, as we are informed, to make a voyage to the West-Indies, and into the South-Sea, to prosecute his inquiries concerning animal nature, and the influence of climate and air on animal bodies, in those latitudes. He is an able chemist, mineralogist, and botanist, and has discovered many new *subterraneous plants* and *mosses* in the mines. He is a director of several mines in Franconia, and possesses such an universal genius, that much more may be expected from his researches.

CHRISTOPHER DANIEL EBELING, Professor of History and of the Greek language in the Gymnasium of Hamburg, has published the fourth volume, in the German tongue, of his Geography and History of America. The three former volumes contain his account of the northern and eastern states of our confederacy, and of New-York and New-Jersey. The present volume, which we have just received, contains upwards of nine hundred pages, and is employed entirely in a description of Pennsylvania. It is

dedicated to FREDERICK AUGUSTUS and HENRY MUHLENBERG. It is remarkable with what industry and correctness this author collects and arranges the materials of the history and topography of a country which he never saw. We seriously recommend to our readers the forwarding of genuine and authentic information concerning the several States in the American union, to a man who will employ them so ably and usefully as Mr. EBELING. This work is a continuation of BUSCHING's Erdbescribung.

Concerning the new Sort of Manure found in the Town of Kent, in Lichfield County, Connecticut; communicated in a Letter from Mr. Thomas Whitten, *to the Committee of the American Mineralogical Society, established in the City of New-York, dated Kent, August* 16, 1798.

"GENTLEMEN,

"I send you a specimen of mineral substance for examination. I discovered the mine whence it is obtained four years ago; and, by throwing some of it out, I found it made grass grow very largely; and, by trying it on *Indian corn*, found it to be better than plaister of Paris or ashes. Then I gave the farmers about forty tons, and they carried some of it to twenty miles distance, and tried it. They found it to be good for *cucumbers*, *carrots*, *beets*, *cabbages*, *potatoes*, and all sorts of *garden roots*. Last year I built a mill, with four pestles or pounders, and a run of stones, to pound and grind the ore for the people.

"It is the opinion of some, that we are coming to lead or silver, by the looks of the mine. It lays on the ridge of a hill, on my own land; and there are two streams of water, both running to the south, one on the east side, and the other on the west side of the hill. The mine runs north-east and south-west. I have opened each side of the hill at forty rods distance, and find it runs through, and small veins are to be seen at each stream.

"I have dug chiefly on the east side, where the ground has a considerable pitch, and have got the rock eight feet high. After descending three feet there is a parting in the rock, where the red ore layeth. I just begin to come where the water issues through the rock, and begin to get some pieces, as large as a cent, which look like lead, and will cut with a knife. Under foot is the same looking rock.

"The whole hill appears to be of the same kind as that which I have sent you.

"When the sun shines a day or two, there comes a *white substance* out of the rock, which so covers it all over, that I can

scrape it off by handfulls. I send you also a sample of this. I would thank you to send me a letter, &c.

"I am, Gentlemen,
"Your very humble servant,
"THOMAS WHITTEN."

A parcel of this *new manure* has likewise been received from Dr. Buel, of Sheffield, Massachusetts, and subjected to examination.

Since this substance is related to be so highly valuable for a manure, it was deemed worth the while to analize it particularly and with care.

On being subjected to a variety of tests and experiments, the samples which have been received have been found to consist chiefly of a loose mixture of *carbone* and *iron* (plumbago, or carbure of iron), bedded in a *friable silicious rock*—and this combination of *coal* and *metal* appears to be its valuable and fertilizing part: for the *white substance*, described in Mr. Whitten's letter, is a mixture of the acid of sulphur with iron and clay, constituting *copperas* and *allum*. Those ingredients may, therefore, be deemed sterile, or, perhaps, noxious to vegetation. Whether the quantity of them is sufficient to make it profitable to extract them for economical purposes, the proprietor can best determine.

It is hoped a particular history of the effects of this manure will be given by some person who has it in his power to watch its operation, experimentally, on farms and in gardens.

Sir Joseph Banks, President of the Royal Society of London, has forwarded to Dr. Mitchill copies of two botanical works, edited by himself. The one is Kæmpfer's *Icones Selectæ Plantarum*, select figures of plants, collected in Japan, published from the originals in the British museum: the other is *Reliquiæ Houstounianæ*, or figures of the plants collected in South-America by William Houstoun; published from his own engravings, now in the library of Sir Joseph. It is much to be regretted, that men of large fortunes do not more frequently expend a part of their income in promoting useful inquiry, and enlarging the bounds of knowledge, as this munificent and enterprizing gentleman does.

In the year 1792, the Legislature of New-York appropriated the sum of £750 annually, for several years, for the endowment of additional professorships in Columbia College. This liberality was the theme of praise among all persons who heard it, in foreign parts as well as at home; and New-York was considered the patronizer of letters and of science. This allowance, however, from the treasury of the state, was, in reality, not a gratuitous of-

ing to that seminary, but a very inadequate and trifling compensation for the lands belonging to the college, lying in the counties of Cumberland and Gloucester, and ceded, without an equivalent, to the people of Vermont, by the commissioners appointed by law to treat with the citizens of that state. Had not the property of Columbia College been thus taken away, and sacrificed between contending claimants, there would have been no need of soliciting or receiving public bounty.—It was hoped by the public spirited citizens of the state, and by the friends of its literary and scientific reputation, that this grant of money, which is now about to expire, would have been continued at the last sessions, ending in April, 1799: but no such thing was enacted. On the contrary, although the regents of the university, in their annual report of March 1799, subscribed by Mr. Jay, the Governor of the state, informed the legislature that "much good has resulted from this enlargement of the plan of academical instruction," and that the *useful professorships*, supported by that fund, are in danger of entirely "falling to the ground, unless they continue to be sustained by the bounty of the legislature," the continuance of the grant, even for a small number of years, was altogether withheld. This retrograde step in public spirit and improvement is worthy to be recorded and kept in remembrance. Such a refusal to aid the CAUSE OF EDUCATION, *by providing for the training up of youth in the liberal arts, sciences, and virtue*, deserves to be contrasted with the profusion with which the legislature have endowed a STATE PRISON, *for the accommodation of a set of wretches, many of whom have forfeited their right to live in society, and who are, by their crimes, rendered unfit to be any longer members of it, with boarding and lodging, and clothes, and food, and drink, for terms of years, or for life.* TWO HUNDRED THOUSAND DOLLARS *have been appropriated to save rogues and convicts from the whipping-post and the gallows;* while SEVEN HUNDRED AND FIFTY POUNDS are denied, to aid the instruction of our youth *in natural and moral things.* We feel much concern in laying these matters before our readers, who cannot fail to reflect on the disproportion of the means employed to form the minds of our youth, the hopes of the country, by every liberal incentive, to habits of rectitude; and the means adopted to restrain criminals, the despair of society, by locks and bars, from overturning the foundation of the laws.—We hope there will be no occasion of animadverting again upon the *singular contrast.*

We understand that Dr. Priestley is shortly about to commit to the press, a work *on the Institutions of* MOSES, *compared with those of* BRAMHA *and the Eastern Asiatics.* A candid comparison of

the law of the HEBREWS with that of the HINDOOS, by such a hand, cannot fail to interest a large number of our learned and inquiring citizens.

A handsome impression of the anatomical appearance of the human body, after removing the common integuments, has been executed by Alexander Anderson, M. D. of New-York. A part of the abdominal and thoracic viscera are also represented. The engraving is about thirty-six inches by eighteen, and is done in wood, after the manner of Mr. Bewick. This promising young artist, who has repeatedly given proofs of his taste and skill, has sailed for Europe, to perfect himself in the art of engraving, under the best masters in London and Paris.

We have received from Mr. TILLOCH the several numbers of his *Philosophical Magazine*, published in London. The satisfaction with which we have perused this excellent work, can hardly be expressed stronger than by the copious extracts from it, inserted in the following article of this number of the Medical Repository. It gives an excellent view of the state and progress of philosophy, especially in the physical sciences.

FOREIGN.

Magnetism.

WENZEL has proved that cobalt is susceptible of magnetic attraction, and has magnetic poles. Klaproth has proved, that the purest nickel, that even of the Chrisoprasus, is also susceptible of the same attraction, and has magnetic poles. The serpentine of Humboldt has magnetic poles, but does not attract iron. The case is the same with several sorts of lava. Here, then, are bodies which have polarity, without attracting iron. Are there bodies which act upon iron without having polarity? Tralles, a geometrician of Berne, has taken very small fragments of Humboldt's serpentine, which had very perceptible poles, and, having placed them close to very strong magnets, the poles of which were opposite to those of the serpentine, the poles of the serpentine became inverted.

Letter from his Prussian Majesty to the Academy of Sciences at Berlin. Read in the sitting of the 19th of April, 1798.

After procuring the necessary information respecting the pre-

sent state of the Academy of Sciences at Berlin, it appears to me requisite to make some changes, calculated to ensure to that institution an existence equally honourable and useful for the public good.

I cannot conceal from the academy, that its labours, taken in the aggregate, have always appeared to me too little directed towards the public benefit. It has confined itself too much to the discussion of abstract subjects, and to enriching metaphysics with speculative theories and learned discoveries; and has not paid sufficient attention to direct its labours to objects of real utility, the improvement of the arts and sciences; a service by which the Academy of Paris, for example, notwithstanding its many defects and vicious organization, formerly distinguished itself. I could wish, then, that the Academy of Berlin would *humanize* itself more, if I may use the expression, than it has hitherto done, by giving encouragement to efforts that contribute to the happiness of common life, to the improvement of every thing that concerns its wants, and to its inconveniences, by the constant application of the theory of the sciences, to things rather than to speculative meditations; that it would excite the national industry, which so often makes attempts in new channels, without success, for want of the necessary knowledge, by furnishing it with the principles suited to that art which it exercises; that it would endeavour to purify the different systems of moral and literary education from many vague and erroneous principles, which fashion, and the imagination of some enthusiastic pedagogues, have introduced, and which must degrade future generations; and that it would combat the prejudices and delusions of the people, as well as the licentious and destructive efforts of the false philosophers of the present day.

It is by directing the labours of the different classes of the academy towards objects of this nature, and towards a multitude of others, the influence of which is equally salutary to the state and to its subjects, that this institution can acquire the most glorious titles to the gratitude of the public. The talents of its members authorize me to entertain great hopes, and seem to have need only of permanent impulse in a good internal direction. It belongs to the academy to call forth the principles of it from its own bosom. The following are a few general points, which serve as a basis for a new arrangement. The academy, after having maturely weighed them, will make the application of them in detail, and will draw up articles of regulation, which it will take care to lay before me to receive my approbation and signature.

The ancient regulations of the academy—above all, that of the year 1746—will be retained, and put in force, so far as they are not abrogated by the new.

I shall take care to appoint a president, distinguished by his rank and literary talents. His duty, above all, being to maintain the established order, to concentrate and direct the labours and talents of the different members towards objects useful to the public and honourable to the academy, to watch over the administration of its finances, and be its organ with my person, it will be necessary to fix the extent and limits of his functions by an express article.

The economical commission of the academy, which has hitherto subsisted, shall be abolished, and its place supplied by a directory.* The members who composed the commission shall, however, be maintained in the enjoyment of their pensions.

The directory shall be formed of a president, the four directors† of the classes, and two members, to be chosen not from the academy, but men of business, equally distinguished by their literary merit, and capable of preserving the necessary order in the economical state of the academy. I propose, for filling these places, Suarz,‡ privy counsellor of justice, and Bogstede,§ privy counsellor of finances, who, at the same time, will be elected members of the academy.

Every thing which relates to the general direction of the academy as a body, to the maintenance of internal order, the management of its finances, and, above all, the direction of the academy towards objects of public utility, shall be the province of the directory. Its deliberations shall be decided by a plurality of votes. Each member shall have one, and the president two.

The influence and rights of the directors in their classes seem also to require to be more particularly defined and regulated; and the academy will take care to make provision on this head by an article in its regulations.

The members of the academy shall be either honorary or ordinary. The former, not being properly obliged to engage in its labours, cannot enjoy any of the lucrative advantages of the academy, except in regard to medals, in case they are present. The ordinary members shall be divided, as hitherto, into four classes.

Each class shall be composed of a director and six members, which will form a whole of twenty-four academicians, besides the members of the directory. It will be proper to adhere, in future, to that number, and not to admit new members but when there are vacancies. There can, therefore, be no new election,

* The ex-minister, J. Ch. Wöllner, assisted at the sitting of March 29, as chief of the economic commission, for the last time.

† H. B. Merian, J. Bernoulli, F. K. Achard, and Ch. G. Selle.

‡ Died on the 14th May, 1798.

§ Installed in the sitting of May 3.

but when the members of each class are below six in number. As, at present, there are classes which have more, it may, perhaps, be possible to transfer some of them to the classes which have not the fixed number, or to those which have fewer supernumeraries, in order to establish a kind of equality between the classes, and, by these means, to approach as near as possible to the order to be observed in future. In the last place, the right of electing its members shall be preserved to the academy; and this election shall be determined by a plurality of voices of all the members: I, however, reserve to myself that of confirming or rejecting.

The large public library at Berlin, as well as the collection of natural curiosities, shall be united, in future, with the academy, and entrusted to its direction. It will be, therefore, necessary to determine, by a regulating article, the arrangements to be made in that respect; and as it will be requisite that the principal librarian be an academician, the academy will have the less hesitation to admit Dr. Biester* among its members, as his knowledge and literary merit have already ensured him the suffrages of the public.

To conclude: though I am disposed to preserve to the academy the enjoyment and administration of its funds and revenues, I, however, reserve to myself the right of deciding more particularly on this subject, after the new state of its economy for next year shall have been presented to me for signature. In regard to that of the current year, which accompanied the letter of the 28th, it is herewith returned.

FREDERICK WILLIAM.

1798. *Received April 11th.*

A singular Phenomenon in regard to Cream.

The following singular phenomenon is announced in the *Journal de Physique*, Thermidor 6th, 1798, by Cit. de Serain, *officier de santé* at Saintes.—This summer I was witness to an extraordinary fact, to me totally new, and which, in my opinion, cannot easily be accounted for. One day, when some people in this nighbourhood were preparing to churn butter, they were astonished to find all the cream of a fine Prussian-blue colour. The caseous part was only blueish. Every attempt to discover the cause of this extraordinary colour was fruitless, though the cream exhibited the same appearance for nearly three months. It cannot be ascribed to the vessels in which the milk was generally preserved, as they were always kept perfectly clean, and covered with fir boards. The cows were in exceeding good health, and fed on meadows,

* Installed in the sitting of April 26.

on which they had grazed for several years. This milk was used as food, without any hurt ensuing, and it betrayed no particular taste; but the cream and caseous parts were thrown away, as they inspired some dread. The cream gradually changed its colour; but this could not be ascribed to the means employed during the continuance of the phenomenon, means, indeed, so ridiculous that I do not think it worth while to detail them.

In the Ephemerides of the Curious of Nature, Dec. 2d, 1688, we find instances of milk being coloured green, black, red, and yellow; but I am acquainted with no observation similar to that above-mentioned.

Physiology.

Professor Weideman, at Brunswick, transmitted lately to the Royal Academy of Sciences, a paper on the more exquisite sensibility of certain parts of animals, from which the following is an extract in the author's own words:

"Many animals have a most exquisite sensibility at the tip of the muzzle, and particularly those which have these parts long. This delicate sensibility is principally produced by the end of the *nervus infraorbitalis*, in conjunction with some fibres of the optical nerves, especially the middle branches, which run across the *masseter* in an oblique direction. The *nervus infraorbitalis* is strongest in those animals which have long muzzles, or muzzles covered with long whiskers. The muzzles of animals are moved, in particular, by three delicate muscles: and, besides these, several folds of the cutaneous muscle lie at the side of the snout, and the branches of the optic nerves proceed, in particular, to these muscles. I, however, found, in a hedge-hog, some fibres of the optic nerves proceed to the root *(bulbus)* of a bristle. For the most part, however, these roots of the long whiskers are connected with the numerous and proportionably strong branches of the *nervus infraorbitalis*, which proceed to them in the form of a bundle, and, in general, transmit two fibres to the root of each bristle, which they embrace on both sides. This appearance I found exceedingly pretty in the head of a hare newly killed. In animals not provided with these whiskers, the nerve proceeds only to the glandulous skin of the nose, and which may be very distinctly observed in swine. The whiskers serve as the vehicle of a finer sensation, in order to forewarn animals, in certain circumstances, of the near approach of danger; for the slightest touching of the summits of these bristles excites in them a very strong sensation. Cats, and other animals which hunt for their prey in the night-time, extend the skin of the whiskers, which enables them to ascertain the nature, and even the hardness or softness of the bodies which they approach."

Cit. Langles, a member of the *French National Institute*, has already contested with the Europeans the invention of the compass, of paper, and of printing, in order to assign them to the Orientals. In a new memoir on gunpowder, he deprives the German monk, Berthold Schwartz, of the fatal honour of that terrible invention, and asserts, that it was conveyed to us from the Arabs. He assures us, that they made use of it, in 690, at the siege of Mecca; and he adds, that the Arabs derived it from the Indians, among whom it was known in the remotest antiquity, since their sacred books (the Vedam) forbid the use of it in war. Cit. Langles is of opinion, that a knowledge of these different inventions might have come to us from the east, on the return of the crusaders. There is an interval, however, of two centuries, between the last crusade and the first typographical attempts of Guttemberg, in the city of Strasbourg, about the year 1440. Gunpowder was known earlier in Europe than printing; but it does not appear that it was employed there in war before the battle of Creci, where the English had six pieces of cannon. If the conjectures of Citizen Langles are well founded, the Europeans, at present, only carry back to the east, knowledge which we formerly borrowed from that quarter. Thus every thing changes on the face of the globe: the arts are lost in one nation to be revived in another; nations themselves are effaced and disappear; and vast accumulations of water covered formerly those countries which we inhabit at present. All this proves, that the small globe upon which we reside is very old; and that to live a century or two is nothing. We have scarcely time to commence our studies.

Cit. Langles read also a memoir on the Arabian literature.

An abstract of a paper (read at a former meeting) entitled *Experiments to determine the Density of the Earth, by Henry Cavendish, Esq. F. R. S. and A. S.* has been read to a meeting of the Royal Society of London. These experiments, which are extremely ingenious and interesting, are detailed at full length in Part II. of the Transactions for the present year. They were projected by the late Rev. John Michell, F. R. S. but he did not live to carry them into effect. After his death the apparatus came to the Rev. F. J. H. Wollaston, Jacksonian Professor at Cambridge, who transferred them to Mr. Cavendish. The apparatus contrived for making sensible the attraction of small quantities of matter, and which has been improved by Mr. C. is very simple: it consists of a wooden arm six feet long, suspended by the middle, in an horizontal position, by a slender wire forty inches long; to each extremity is hung a leaden ball about two inches in diameter; and the whole is inclosed in a wooden case, to defend it from the wind.

As no more force is required to turn this balance on its centre, than is necessary to twist the slender suspending wire, the smallest degree of attraction of a leaden weight or weights, a few (eight) inches in diameter, brought near to the small suspended ball or balls of the balance, will be sufficient to move it sensibly aside.

To determine from hence the density of the earth, all that is necessary is to ascertain what force is required to draw the arm aside through a given space, and then to have recourse to calculation.

To prevent any disturbance from currents that might be produced within the box that contained the balance, by even the difference of temperature that might be occasioned by heat being communicated, by the bodies of the experimenters, to one side of it more than another, it was supported in the middle of a close room; the operators, from adjoining apartments, viewed the operation through holes in the wall, by means of telescopes; and the apparatus had a strong light thrown upon its two ends (an opening being left at each end of the box for the purpose), by means of two lamps, also in the adjoining apartments, the rays from which were likewise made to pass through holes formed in the wall.

The two large balls were suspended from a beam near the cieling, which could be moved in an horizontal direction, by means of a string and pulley, so as to be brought near to the small balls of the balance, or made to recede again, without requiring any person to be in the room.

From this description it will be easily seen, that, on the two large balls being brought near to the two small ones, but on opposite sides of each, that their forces may not counteract each other, the small suspending wire of the balance must be twisted by the movements of the arms, occasioned by attraction, which carries the small towards the large balls; and that the wire, endeavouring to untwist itself, will again, in its turn, carry the small balls away from the large ones. Vibrations are thus occasioned, which would continue a long time before the small balls would settle between the first point of rest and the large balls: but it is not necessary to wait for this; an ivory scale at each end of the balance enables the experimenters, by means of their telescopes, to see the two extreme divisions to which the small balls move in their vibrations, and thus to determine the middle point. The time necessary for each vibration is also noticed.

It would be impossible, in a short notice, to do justice to Mr. Cavendish's ingenious experiments, and the calculations founded on them. Those who feel themselves interested in them will have recourse to the original account. We shall only mention the result. By a mean of the experiments, the density of the earth comes out 5·48 times greater than that of water.

By the experiments made by Dr. Maskelyne, on the attraction of the hill Schehallien, the density of the earth was computed to be only $4\frac{1}{2}$ times that of water.

A paper* by Mr. Home was also read, containing an account of some experiments, made in order to ascertain the cause of the light seen in the eyes of cats and some other animals in the dark. After enumerating the opinions of other philosophers, he proceeds to shew, that when the light was perfectly excluded from the room in which the cat was placed, the eyes were never observed to shine; whence he concludes that the eye merely collects the light diffused through the room. He then relates some observations on the structure of the optic nerve. Having dissected the eye of a cat just killed, he was surprized at finding the retina *transparent*. This induced him to repeat the experiment, not only on cats, but also on horses, and always with the same result, if the retina was examined immediately after death. But if this examination was delayed an hour or two, it was opake and whitish, as described by anatomists. The optic nerve, from the retina to the brain, seemed to be composed of bundles of fibres not parallel to each other, but alternately interwoven and separated, the interstices filled with a transparent fluid, so that a transverse section, taken near the brain, was nearly a circle, containing about forty opaque round spots; near the eye about two hundred of these spots, and in the middle about a mean between these numbers. These observations were made with a microscope magnifying about twenty-three times.

At their second meeting, on the 15th, a paper by the Rev. Mr. Vince, on an unusual atmospherical refraction, was read.—One day last summer, directing his telescope to the sea, he observed part of the mast of a cutter (the hull being below the horizon), and above it an inverted image of the cutter, above which appeared a direct image of the same: these two images were joined at their hulls; but the point of the mast of the inverted image appeared to be as far above the top of the real mast as this last was above the horizon. These images appeared and disappeared very suddenly, something like the beams of the aurora borealis, beginning a little above the real object, and darting upwards.—The learned author, after supposing these appearances to be occasioned by atmospheric strata of different densities, recommends it to philosophers to investigate this subject; and suggests the utility of stationing men, provided with telescopes, at certain places on the coast; as, by this means, he thinks, vessels and other objects might be sometimes discovered long before they would otherwise become visible.

* The Croonian Lecture.

APPENDIX.

DOMESTIC.

ARTICLE I.

Application of the Doctrine of Septic Fluids to explain some of the Diseases of Human Teeth and Bones. From a Letter of Mr. MITCHILL *to* THOMAS CHARLES HOPE, *M. D. &c. adjunct Professor of Chemistry in the University of Edinburgh. Dated Schenectady, Oct.* 10, 1796.

IT gives me great satisfaction to learn, from your letter of September 5th, dated at Edinburgh, "that you very much agree with me in the views I have adopted respecting the generation of the various combinations of oxygene and septon;"—that you feel interested in the progress I may make in the inquiry, and have pleasure in collecting and communicating any thing relative to it that may occur.—As you suggested, the pamphlet in which the experiments made to destroy contagion in the British and Russian ships, by means of the vapours emitted from salt-petre, had reached me before the receipt of your letter; and I had attempted to shew in what manner "the facts might be entirely reconciled with the opinion" which, as you politely observe, "so many concurrent circumstances have led me to adopt." I rejoice that these experiments have been made, and by public authority, upon so large a scale. I hope they will be repeated until complete satisfaction shall be obtained of their true nature and value. From summing up the whole evidence in the most impartial manner I am able, I am induced to believe the greatest part of the benefit derived from them arose from ventilation, purification, removal of nuisances, and the better medicinal and dietetic management of the sick; and the rest of the good experienced proceeded from the *vital air* extricated from the nitre. The *nitrous gas* appears to have been so far from doing any good, that I am confident the result would have been more clear and decisive without it. I should, therefore, propose, as an amendment of the project, to perform all that was performed on those occasions, excepting the *septic gas*, and improve the respirability of the air in the apartments, by supplies of *oxygenous gas* alone.

Since the date of my last, I have had no reason to retract any part of the doctrine then advanced; but, on the contrary, there has been such an influx of new matter, that I have found a necessity of enlarging and extending it in all directions. For want of something better, I now take the liberty of presenting you with the application of it, to explain some of the morbid changes which the *teeth* and *bones* of animals undergo in the progress of life. It seems to me we are far enough advanced in knowledge, to attempt something like a scientific explanation of some of the alterations which bones suffer by disease: and this explanation will be the more seasonable, as the writers on surgery have scarcely undertaken any thing of the sort. What I have aimed at, in this respect, is, to connect the facts related by the late Mr. Hunter, of London, with those detailed by Mr. Russel, of Edinburgh, by means of certain experiments and observations of my own.

From the known disposition of oxygene to combine with septon, and form the septic acid, it appeared to me probable, that it would be formed occasionally in the human mouth, from the remains of food adhering to the teeth, sticking between them, and corrupting there. If this was the case, this acid ought to unite with the calcareous earth of the teeth, and form the septite of lime, which might be washed away by the spittle, or, possibly, in some instances, concrete upon the teeth themselves; and, if formed there, the acid might be expected to corrode the enamel, lay bare the bony part, and bring on a caries; or to incrust the outside, irritate the gums, and occasion soreness and bleedings.

In order to determine whether these things were so, I procured, from a dentist, a quantity of the substance called "the tartar of the teeth," which I supposed might contain some septite of lime, and subjected it to a number of experiments.

Having, some time before, received complaints from the merchants of Glasgow, of the faulty quality of the pot-ash and pearl-ash, supplied from the port of New-York, and having been requested, by the President of the Chamber of Commerce, to visit, with him, the stores of the inspectors of those articles in the city of New-York, I had collected samples of pot-ash and pearl-ash, of the first qualities, with the view of making some experiments upon them.

These salts, being in their caustic state, had been placed in separate glasses, to attract water and carbonic acid from the atmosphere; and, after standing several months, the ferruginous and earthy parts having subsided, beautiful crystals of the alkali were formed at the bottom of the liquor.

A solution of these crystals was made in water that had been boiled some time, to extricate its air, and precipitate some of its

earth; and to this solution of pot-ash was added a parcel of the yellowish earthy matter scraped from human teeth, which had been previously reduced to powder in a mortar.

Instantly on mixing them, bubbles of air were set loose, and thickly floated on the surface of the mixture; and by their long continuance without bursting, seemed to indicate a sort of tenacity in the fluid, derived, probably, from animal mucilage.

The coarser part of the earthy matter soon sunk to the bottom, but the finer particles took a long time to settle down; yet, in a few minutes, even before the liquor had become clear, a piece of clean paper, dipped in the solution, and dried before the fire, deflagrated on being burned, and emitted numerous flashes and sparkles, after the manner of salt-petre; while no such lucid or radiant appearance was evident on setting fire to paper that had been dried after dipping in a solution of the alkali alone.

It is not unworthy of remark, that the smell of the mixture was offensive and nauseous, resembling, as much as any thing, the nasty odour of ditch and puddle water. On repeating the experiment several times, and in the presence of several persons, the above-mentioned appearances were, with trifling variations, similar.

The object of inquiry having been less to make an entire analysis of the lapis dentalis, or "tartar of the teeth," than to ascertain whether it contained any *septic* acid, I shall content myself, for the present, with the persuasion, that the question is determined in the affirmative, *by the union of the septic acid of the tartar* (which would seem to consist partly of nitrite of lime, combined with animal mucus, &c.) *with the alkali of the mixture into nitre, which deflagrated on being subjected to the operation of fire with the paper to which it had attached itself.*

In order to apply this principle, it must be understood what the component parts of the teeth are. SCHEELE and GAHN seem, as long ago as 1776, to have succeeded in obtaining *phosphoric* acid from the bones of animals, by employing septous (nitrous) acid, which dissolved their lime, and constituted with it calcareous nitre, while the phosphoric acid was set free. More recently, BERNIARD (Journal de Physique, Octobre, 1781.) obtained phosphoric acid not only from fossil bones, from those of the whale and sea-horse, but from the tooth of the manati, and the grinder of the elephant. It has also been extracted from ivory.

In short, they who have experimentally attended to this subject have agreed, that animal *bones* are chiefly composed of phosphoric acid and calcareous earth, or are phosphats of lime; and that their *teeth* consist, in the main, of the like materials. Septic acid, therefore, formed in the mouth, decompounds teeth upon the same principle that, in the experiments of the Swedish chemists, it dis-

organized bone; that is, by detaching the phosphoric acid from the lime, and combining itself with that earthy basis.

HUNTER (Natural History of Human Teeth, p. 125.) has an idea that the concretions on the teeth resemble the intestinal balls and bezoars found in the bowels of many animals—and this opinion is probably very just; but, perhaps, less just is his other idea, that these extraneous matters consist merely of "earth and the common secreted mucus." (Diseases of the Teeth, p. 66.) He informs, that he has seen such earthy depositions "cover not only the whole tooth, but a part of the gums: in this case there is always an accumulation of a very *putrid* matter, and frequently a considerable tenderness and ulceration of the gums, &c."

The destruction of the enamel and bony part of the tooth, the rottenness of the alveolar processes, the ulceration, absorption, and bleedings of the gums, and the fetid breath, seem to arise occasionally from the same general cause.

To understand the reason of these things, it will be necessary to examine what is the order of chemical elective attraction between phosphoric acid, one of the constituent parts of the teeth, and other bones, on the one hand—and between lime, the other ingredient, and the substances with which it has a disposition to combine, on the other. And in doing this, there will be little or no danger of encroaching upon the vital œconomy or animated structure of these parts, because the *enamel* "has no marks of being vascular, and having a circulation of fluids." (Natural History, &c. p. 35.) And there are great doubts whether even the *bony* parts possess either blood-vessels or absorbents. (Ibid. p. 39.)

Phosphoric acid prefers lime to alkalis, and, therefore, alkalis united with it are immediately rendered turbid by lime-water; and a saline powder, very difficultly soluble in water, is deposited, consisting of lime saturated with phosphoric acid. Alkalis, therefore, whether fixed or volatile, would seem to be incapable of destroying the solid matter of the teeth, whatever their action may be upon the gums. Lime may be disengaged from its connection with phosphoric acid by the oxalic, sulphuric, septic (nitric), and tartaric acids. Consequently, acid of sugar, spirit of vitriol, aquafortis, and cream of tartar, may decompose the teeth by attracting the lime, and disengaging the phosphoric acid. The septic acid, after barytes, pot-ash, and soda, has the next strongest attraction for lime, and after this, for magnesia, ammoniac, and clay.

Septic acid thus, if formed from the remains of animal and vegetable substances, lurking about or among the teeth, in attaching itself to the lime, will detach the acid of phosphorus. This, added to the matters already emitting their scents, will have a tendency to increase the offensiveness of the breath.

Whatever contributes to the accumulation of the matters from which septic acid is produced, may be expected to injure the teeth. Hence lying-in women, and persons suffering long fits of sickness, are particularly exposed to the causes which destroy them; and this the more rapidly, because, in such situations, it often happens, that little or no assistance is afforded by art, in removing those things which, by their presence and accumulation, occasion the mischief. When formed in the mouth, it may mingle likewise with the spittle, and vitiate the *gustatory powers of the tongue and palate*, and, when swallowed, may impede the healthy *functions of the stomach*. Hence may be explained one species of anorexia, especially that mentioned by DARWIN (2 Zoonomia, class II. ord. 2. gen. 2. sp. 1.), where "want of appetite is sometimes produced by the putrid matter from many decaying teeth, being perpetually mixed with the saliva, and thence affecting the organ of taste, and greatly injuring the digestion."—The formation of such a substance in the mouth enters deeply into the explanation of the symptoms of fevers, particularly the condition of the teeth, gums, tongue, and throat; with vitiated taste, thirst, apthæ, colour of the tongue, &c.

If an incrustation containing septic matter is thus formed, and is a calcareous composition, of a kind different from the teeth, it is possible to remove it by chemical agents, which have not the power of decomposing the teeth. For, as barytes, pot-ash, and soda, can take the *septic acid* away from the lime, either of these substances may be serviceable in removing the concretion, and, at the same time, not endangering the teeth, whose *phosphoric acid* having a greater attraction for lime than for alkalies, is incapable of being displaced by them. Alkaline dentifrices would, therefore, appear capable of removing the calcareo-septic incrustations from the teeth, but incapable of corroding the teeth themselves. DEBOZE observes, that tobacco ashes *(La Pratique de Medecine de Laz. Riviere, &c. L.* vi. *ch.* 2.) possess a surprizing (tres-merveilleuse) power to cleanse and whiten the teeth. The active ingredient must be the pot-ash. The practice of some ladies of New-York confirms this.

As the septite of lime, however, is very deliquescent, there is, perhaps, only a moderate portion of the septic acid contained in the stony tartar of the teeth. There is another form in which it is peculiarly destructive. Dentists distinguish tartar into three species, to wit, the *yellow*, the *black*, and the *green*. Of these, the last is observed to be, by a great difference, the most pernicious. It never forms a crust or petrifaction, but always appears like a *green stain*. The enamel of the teeth beneath it is generally corroded, and almost always eaten through or destroyed. This is, doubtless, owing to the *septic acid* formed under the edge of the

gum, or between the teeth, from the remains of food containing septon, which, aided by the heat and moisture of the mouth, affords that poisonous and destructive fluid, by uniting with oxygene. I have no hesitation to believe, that a small portion of this acid, formed thus in the mouth, and adhering to a sound tooth, is the cause of that violent, and sometimes fatal disease, consequent upon transplanting these bony substances into the bleeding jaws of another person. The cases are seldom or never venereal.

But the septic acid formed in these instances, by corruption on the surface of a tooth, poisons the patient of the dentist, when inserted into the fresh socket, in the same manner that it poisons dissectors, when their wounded fingers receive it from the surface of a putrefying muscle.

The safe method of preparing teeth for transplanting, is to wash them repeatedly, *before* extraction, with a weak solution of carbonate of pot-ash, in water, to remove the septic acid and other foul matters. This is, doubtless, preferable to washing the tooth in alkaline ley, *after* it has been drawn, as thereby its capability to grow fast would be endangered.

The septic acid being thus capable of corroding the teeth and the alveolar processes of the jaws, who shall affirm that its operation stops there? Is it not taken in with our air, food, and drink? Are there not instances of nodes and excrescences of bones, that are not wholly unlike the incrustations of the teeth? And are there not likewise instances of caries of the osseous parts, which have a near similitude to the rottenness of the instruments employed in chewing our food? These questions have almost been answered by the poets; and I hope there will be no impropriety, on this occasion, in referring to a poem or two.

VIRGIL (3 Georgic. 478.), in his account of the diseases of cattle, mentions the corrupted state of *air* and *water*. The vitiated qualities of the *atmosphere* and of *water* are ascribed, by OVID (Metamorp. Lib. vii. 437.), to pestilential venom, in the fine description of the plague of Athens, which he makes ÆACUS give to CEPHALUS. The mention of this poet brings to my remembrance his story of the terrible monster PYTHON (Ibid. i. 438.), engendered from the putrid slime or mud of the Nile, and slain by APOLLO, the god of day. The mythologists generally agree that this is a beautiful physical allegory. The term "Python" is derived from the verb πύθω, to putrefy or corrupt; and the truth intended to be inculcated is, that pestilential vapours, the offspring of corruption, cease to rise and contaminate the air, after the sun's rays have dried the land. The rays or shafts of light, then, darted to earth, destroyed Python, that is, exhaled the moisture, and put a stop to putrefaction and its destructive consequences.

The Greeks, who borrowed much of their knowledge from Egypt, interpreted *literally* some of these philosophical allegories. Hence the epithet "*Pythios*" was given to Apollo by some of his worshippers; and under this title the inhabitants of Megara erected a temple to his honour. (PLUTARCH in Vit. Anton.) His priestesses, even at Delphos, were called *Pythias*. And further to perpetuate this benevolent action, the *Pythian* games were instituted, wherein the victors were crowned with garlands of beechen leaves. This author's legend also of the voyage of the god ÆSCULAPIUS to Rome (Metam. xv. 622.), in the form of a serpent, with the committee of Roman citizens sent by the senate, during the rage of the plague in Italy, between the 458th and 462d years of the city, to fetch him from Epidaurus (3 Rollin's R. H. 305.), appears to be nothing more than another allegory, or popular story, expressive of the method taken by the Roman government, to procure, from the better informed Greeks, all the information they could, about preventing and stopping pestilential distempers. As Æsculapius was reputed the son of the Deity, to whom a sirname was given from the monster or serpent he was alledged to have killed on the banks of the Nile, it is probable, when the figurative meaning of the allegory was dropped, the literal interpretation of "Pythius" was transferred from father to son, and thus a snake came to be the type or emblem of Physic. Some pleasant remarks have been made on this subject by Sir SAMUEL GARTH. (Works, p. 153.) I wish some APOLLO or ÆSCULAPIUS would destroy the PYTHON of the United States!

From the same root whence Python is derived, probably come πῦρ, fire, and πῦον, corruption; expressive of the decomposition of natural substances by *combustion* and *putrefaction*." It must have occurred to mankind, very soon after they began to make observations, that when vegetable and animal bodies lost their living energy, or died, they soon underwent an alteration, and laid aside their old, and took upon themselves a new form; and that such of them as were not changed by the operation of *fire*, would yield, sooner or later, to the agency of *corruption*. They must soon have discovered, not only that these were the *two* great destroyers, but that there was a considerable resemblance in their manner of accomplishing their respective works; and that decaying bodies, which frequently evolved, during their decay, a great quantity of heat, were, in such cases, under the influence of both πῦρ and πῦον at once. Hence, in constructing their language, the Greeks, in this instance, as in abundance of others, most correctly kept up an analogy *in words*, corresponding to what they observed in fact.

As long as they confined these terms to express certain changes incidental to *inanimate* objects, the ideas suggested by this me-

thodical language preserved their correctness. But, in ancient times as well as in modern, there has been a constant disposition to transfer the terms appropriated to processes or modifications of *dead* substances, to express the conditions and functions of *life*. This is a source of much inaccuracy in speech and ambiguity in science. For example, the noun πῦρ, which signifies fire, is sometimes employed, by HIPPOCRATES, to express a disease in which *violent heat* was a leading symptom. From this sprung πυρέτιος, a word often used by the old physicians, and also by the four evangelists (even by LUKE, ch. iv. 38. who, as Dr. FREIND observes, wrote the best medical Greek of them all), to signify a disorder in which *much heat* was accumulated. Thence, likewise, came πυρέξις, which appears to have been a more technical or professional term, meaning a distemper in which a *fiery heat* prevailed. The colonies of Greeks who settled in Latium, called afterwards Latins, adopted different modes of expressing these ideas: for that form of sickness wherein "fire" was supposed to predominate, was called by names derived from "fervor" and "flamma," which come from Greek radicals signifying *to be boiling or burning hot;* and hence the latinisms *fever* and *inflammation*, which are so common at this day in our own tongue: and where "putrefaction" was judged to prevail, they expressed the forms of it by putreo, putrefacio, putresco, putridus, &c. all derived from πυθῶ, or πύθομαι; whence come the hellenism "*putrid*," and its kindred words.

Such is the origin of a set of terms which are too firmly established for any authority on earth to alter, notwithstanding they incessantly suggest false ideas to the mind. They have, from the time of their adoption to express any thing resulting from animation, perpetually bewildered those who employed them as mediums of thinking and reasoning on the causes of these kinds of diseases; which have, accordingly, been pronounced to be either *inflammatory* or *putrid*, or of a *mixed sort;* as if the body of a living animal, in which neither combustion nor putrefaction can take place, was subjected to the same accidents which disorganize a corpse! To complete the joke, as diseases accompanied with *great* heat were called by a name synonymous with *fire*, so, where the heat was *small*, they were expressed by a word signifying *smoke;* and such is the typhus (τῦφος fumus) of the present day! From the difficulty of making revolutions, or even reformations, this pernicious effect of words upon ideas, and of language on opinion, will probably last for ages to come.—But to return from this philological digression: the absorption of the like pestilential (septic) matter has been asserted by LUCRETIUS (De Rerum Natura, Lib. 6.)

Hæc igitur ſubito clades nova, peſtilitaſque,
Aut in aquas cadit, aut fruges perfidit in ipſas,
Aut alios hominum paſtus pecudumque cibatus,
Aut etiam ſuſpenſa manet vis aëre in ipſo;
Et cum ſpiranteis miſtas hinc ducimus auras
Illa quoque in corpus pariter ſorbere neceſſe'ſt.
Conſimili ratione venit bubus quoque ſæpe
Peſtilitas, etiam pecubus balantibus ægror.

Sudden this novel plague, from doleſome haunts,
Impregns the floods, infixes in the plants,
Infects the food which men and cattle ſhare,
Or floats promiſcuous, mix'd with common air:
Hence, when the breaſt its *vital gaſes* drew,
The lungs abſorbed the *ſeptic venom* too,
Which not on man alone its force employ'd,
But lowing herds and bleating flocks deſtroy'd.

Who does not see, that from such or a similar venom might have arisen the symptoms of the BEAUTIFUL YOUTH whose case is described by FRACASTORIUS? (Syphylid. Lib. i.)

Paulatim ver id nitidum, flos ille juventæ
Diſperiit, vis illa animi: tum ſqualida tabes,
Artus (horrendum!) miſeros obduxit, et *alte*
Grandia turgebant fœdis abſceſſibus oſſa:
Ulcera (proh divum pietatem!) informia pulchros
Paſcebant oculos, et diæ lucis amorem,
Paſcebantque acri corroſas vulnere nares.

By ſlow degrees the envenomed peſt o'erpowers
His ſpring of life, and blaſts its promis'd flowers,
Invades his joints, extorts diſtreſsful groans,
While deep impoſthumes rot his knobbed bones:
Oh righteous heaven!—of eyes but late ſo gay
Two frightful ulcers eat the ball away,
Whoſe acrid juice, corroding as it flows,
Deforms his look, and undermines his noſe!

And who, on reading this, can fail to recollect the description given by LUCAN (Pharsalia, Lib. ix.) of the miserable condition of SABELLUS, after being bitten in the leg by the Lybian serpent SEPS.

———Miſeri in crure Sabelli
Seps ſtetit exiguus, fixo quem dente tenacem
Avolſit que manu, piloque adfixit arenis.
Parva modo ſerpens, &c. &c. V. 763.

Parva loquor corpus ſanie ſtillâſſe peruſtum:
Hoc et flamma poteſt, ſed *quis rogus abſtulit oſſa?*
Hoc quoque diſcedunt, putreſque ſecuta medullas
Nulla manere ſinunt rapidi veſtigia fati. V. 783.

Wretched Sabellus by a Sers was ſtung;
Fix'd to his leg with deadly teeth it hung:
Sudden the ſoldier ſhook it from the wound,
Transfix'd and nail'd it to the barren ground.
Of all the dire deſtructive ſerpent race
None have ſo much of death, though none are leſs.
* * * * * * * * * * * * *
——Diſſolv'd, the whole in liquid poiſon ran,
And to a nauſeous puddle ſhrunk the man.
* * * * * * * * * * * * *
—— Nor ends the wonder here: though flames are known
To waſte the fleſh, yet ſtill they ſpare the bone:
Here none were left; no leaſt remains were ſeen;
No marks to ſhew that once the man had been. Rowe.

But this opinion is countenanced by better evidence than the poets. For, in addition to the diseases of the teeth and their sockets, from septic acid produced in the mouth, as already stated, and partly upon the interpretation of the facts of Mr. Hunter, it would be very easy to quote many authorities in the books. Instead, however, of displaying much reading, I shall content myself with referring to the authority of an intelligent and skilful surgeon, Mr. Russel, who published, in 1794, a practical essay on that disease of the bones which is termed *necrosis*, wherein a bone or part of a bone dies, and a new one is reproduced to supply its place, or serve as a substitute. The *lower jaw-bone* is frequently disordered in this manner (p. 87.)—its death and separation often arise from *dicase in the teeth and gums*, which, from their situation, naturally determine the complaint to begin at the upper part, and to proceed downwards (p. 80.)—and cases of necrosis of the lower jaw may be traced to the effects of blows, and of *tooth-ach*, especially if a violent attack of inflammation has been excited by the application of any *acrid substance* to a carious tooth, &c. (p. 98.)—and seldom happen to persons under thirty years of age (p. 93.)

It would seem, therefore, that the reasoning would be fair and safe, to consider this caries of the maxillary bone as of a nature quite similar to the decomposition of the teeth and disordered condition of their sockets, which has been shewn to be connected with the formation of septic acid in the mouth, and its corroding effect there.

The fœtor of the breath has an analogy, in such cases, with the offensiveness of matter discharged from diseased bone, which, in general, is discoloured, and not thick; owing to a separation of the phosphoric acid of the bone from its calcareous base, which is now combined with septic acid, and running away with the other fluids, in the form of a thin and sanious discharge; or occasionally bringing on, when absorbed, that form of quotidian

intermitting fever, called the *hectic*, as in other cases of abscess and ulcer.

Russel considers necrosis, whether happening in the tibia, femur, lower jaw, clavicle, humerus, fibula, radius, or ulna, as the same kind of disease (p. 86.) If, then, his classification of morbid affections is correct, and my application of principle to explain the phenomena is accurate, it will be proved, that the same septic poison which destroys the teeth corrupts the jaw; and from the same cause which disorganizes the jaw proceeds the decay of the rest of the bones; and this same agent which works the destruction of the rest of the bones is the irritating matter that kindles up hectic fever.

I would not wish to be understood as affirming that *all* caries of the teeth, jaws, and bones, arise from this sole cause. Far from it. The amount of my reasoning is simply this; that, from the most accurate survey I have been able to take of the subject, there does appear to be, in *some instances*, a decomposition of bone, by means of septic acid, absorbed from without, or formed, by union of septon with oxygene, within the constitution; and when this acid, mingled with other animal fluids, is carried into the blood-vessels, and exerts its noxious powers upon the heart, brain, and lungs, it may be the cause of febrile inquietude.

How far this principle may extend, if properly applied, I know not. I suspect that *syphylitic*, *cancerous*, and *scrophulous* ulcerations will be found to have a near alliance, as to their cause, with caries of teeth and necrosis of bone now under consideration. But time, with further observation and experiment, is necessary to refute or verify this conjecture. Be the result as it may, I think, as the game is started, and the track is fresh and warm, it would betray less than a sportsman's spirit to be discouraged on account of the doublings and windings of the chace, and give out before the object of pursuit is hunted down, or day-light let in upon its dark abode.

But I must quit the subject, and prepare to take my departure from this town, in which, notwithstanding the engagement of my mind upon what is here, you observe I can devote a few minutes to a correspondent in Europe.

To have an idea of the state of things at this place, picture in your mind a settlement, the third in size in the State of New-York, situated in a level spot, beside the river Mohawk, and not far above its greatest cataract; fancy to yourself the chief impediments to navigation removed, and the river covered with boats, loaded with families migrating westward, to the unsettled lands, or with the fruits of agricultural industry coming to market; imagine the goers and comers of gay people and valetudinarians along this thorough-fare, to the acidulous and medicinal springs

of Ball's-Town: and the employment of the sons of letters and of arts belonging to the respectable seminary of learning lately established here, in attending to such branches of knowledge as boys are usually taught in colleges: but do not imagine these things and others of a beautiful——Farewell—and remember I expect from you, as one of the friends and companions of my earlier days, all the help you can afford me in this inquiry.

Yours, with much esteem,

SAMUEL L. MITCHILL.

ARTICLE II.

To the SENATE *and* HOUSE *of* REPRESENTATIVES *of the* UNITED STATES, *in Congress assembled.*

THE Memorial of the subscribers, inhabitants of the city of New-York, for themselves and in behalf of their fellow-citizens, respectfully sheweth:

That, during the voyages made to and from the port of New-York, it often happens that the foulness proceeding from the crews and passengers, as well as from sundry articles of provisions and merchandize, on board their ships and vessels, turns to pestilence, and destroys the lives of many of the youngest and stoutest seamen in the merchant service.

That, from the repeated and long continued application of the impurities so produced and confined on ship-board, the timber of their vessels becomes impregnated with mischievous matter, insinuating itself into the pores of all the wooden work beneath the decks, and issuing forth occasionally in poisonous steams.

That such ships and vessels, themselves frequently old and offensive, loaded with corrupting substances yet more offensive, enter the port of New-York from foreign parts, and, unless stopped in their progress, straightway cast anchor in the vicinity of the city, and presently haul in beside the wharves.

And your Memorialists further state, that the lives of a number of their fellow-citizens on shore appear to have been destroyed by going on board such foul vessels, as well as by exposure to the exhalations from rotting substances taken from their holds, and carted through and stored within the city.

That the laws passed by the State Legislature have hitherto been found inadequate to the purposes of entire prevention of such ar-

rival and unloading, for want of a wharf, stores, and inclosed piece of land, at some convenient distance from the city, where sick persons might be taken out, foul cargoes landed, under the inspection of a revenue-officer, and the vessels cleansed by the agents of the Health-office.

That the regulation of commerce belonging exclusively to the National Legislature, this great and terrible evil of filth and sickness, thus introduced, cannot be sufficiently guarded against, unless the authority of the General Government should cause a piece of land to be purchased, and a wharf and stores to be erected thereon, somewhere between the city of New-York and the Narrows, to be under the direction of the Collector of the port.

Your Memorialists therefore pray, that such arrangements may be made, as in your wisdom may seem proper, to provide against this source of pestilence, engendered on board our ships, by erecting a suitable establishment on the east side of Staten-Island, or on any more convenient place, at the expence of the United States, and under the controul of the Custom-house, where sick persons may be taken care of, unhealthy cargoes hoisted out and overhauled, and infected vessels thoroughly purified.

SAMUEL L. MITCHILL,
JOHN OOTHOUT,
JACOB ABRAMSE,
RICHARD BAYLEY,
GULIAN VERPLANCK,
CORNELIUS RAY,
MOSES ROGERS,
JOHN B. COLES,
GABRIEL FURMAN,
WILLIAM BAYARD.

ARTICLE III.

An ACT *respecting Quarantines and Health Laws.*

Sect. 1. BE *it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the quarantines and other restraints, which shall be required and established by the health laws of any State, or pursuant thereto, respecting any vessels arriving in, or bound to, any port or district thereof, whether from any foreign port or place, or from another district of the United States, shall be duly observed by

the Collectors, and all other officers of the revenue of the United States, appointed and employed for the several collection districts of such State respectively, and by the masters and crews of the several revenue cutters, and by the military officers who shall command in any fort or station upon the sea coast; and all such officers of the United States shall be, and they hereby are, authorized and required faithfully to aid in the execution of such quarantines and health laws, according to their respective powers and precincts, and as they shall be directed, from time to time, by the Secretary of the Treasury of the United States. And the said Secretary shall be, and he is hereby authorized, when a conformity to such quarantines and health laws shall require it, and in respect to vessels which shall be subject thereto, to prolong the terms limited for the entry of the same, and the report or entry of their cargoes, and to vary or dispense with any other regulations applicable to such reports or entries. *Provided*, that nothing herein shall enable any State to collect a duty of tonnage or impost, without the consent of the Congress of the United States thereto. *And provided*, that no part of the cargo of any vessel shall, in any case, be taken out, or unladen therefrom, otherwise than as by law is allowed, or according to the regulations hereinafter established.

Sect. 2. *And be it further enacted*, That when, by the health laws of any State, or by the regulations which shall be made pursuant thereto, any vessel arriving within a collection district of such State, shall be prohibited from coming to the port of entry or delivery by law established for such district; and it shall be required or permitted by such health laws, that the cargo of such vessel shall or may be unladen at some other place within or near to such district, the Collector authorized therein, after due report to him of the whole of such cargo, may grant his special warrant or permit for the unlading and discharge thereof, under the care of the Surveyor, or of one or more inspectors, at some other place where such health laws shall permit, and upon the conditions and restrictions which shall be directed by the Secretary of the Treasury, or which such Collector may, for the time, reasonably judge expedient for the security of the public revenue. *Provided*, that in every such case, all the articles of the cargo so to be unladen shall be deposited, at the risk of the parties concerned therein, in such public, or other ware-houses or inclosures, as the Collector shall designate; there to remain under the joint custody of such Collector, and of the owner or owners, or master, or other person having charge of such vessel, until the same shall be entirely unladen or discharged; and until the goods, wares or merchandize which shall be so deposited, may be safely removed, without contravening such health laws; and when such removal may be allowed, the Collector having charge of such

goods, wares or merchandize, may grant permits to the respective owners or consignees, their factors or agents, to receive all goods, wares or merchandize which shall be entered, and whereof the duties accruing shall be paid or secured, according to law, upon the payment, by them, of a reasonable rate of storage; which shall be fixed by the Secretary of the Treasury, for all public warehouses and inclosures.

Sect. 3. *And be it further enacted*, That there shall be purchased or erected, under the orders of the President of the United States, suitable ware-houses, with wharves and inclosures, where goods and merchandize may be unladen, and deposited, from any vessel which shall be subject to a quarantine, or other restraint, pursuant to the health laws of any State as aforesaid, at such convenient place or places therein as the safety of the public revenue, and the observance of such health laws may require.

Sect. 4. *And be it further enacted*, That when, by the prevalence of any contagious or epidemical disease, in or near the place by law established as the port of entry for any collection district, it shall become dangerous or inconvenient for the Collector and the other officers of the revenue employed therein, to continue the discharge of their respective offices at such port, the Secretary, or, in his absence, the Comptroller of the Treasury of the United States, may direct and authorize the removal of the Collector, and the other officers employed in his department, from such port to any other more convenint place within, or as near as may be to such collection district, where such Collector and officers may exercise the same authorities, and shall be liable to the same duties, according to existing circumstances, as in such lawful port or district; and of such removal public notice shall be given as soon as may be.

Sect. 5. *And be it further enacted*, That it shall be lawful for the judge of any district court of the United States, within whose district any contagious or epidemical disease shall at any time prevail, so as, in his opinion, to endanger the life or lives of any person or persons confined in the prison of such district, in pursuance of any law of the United States, to direct the marshal to cause the person or persons confined as aforesaid, to be removed to the next adjacent prison where such disease does not prevail; there to be confined, until he, she, or they, may safely be removed back to the place of their first confinement; which removals shall be at the expence of the United States.

Sect. 6. *And be it further enacted*, That, in case of the prevalence of a contagious or epidemical disease at the seat of government, it shall be lawful for the President of the United States to permit and direct the removal of any or all the public offices to

such other place or places as, in his discretion, shall be deemed most safe and convenient for conducting the public business.

Sect. 7. *And be it further enacted*, That when, in the opinion of the chief justice, or in case of his death or inability, of the senior associate justice of the Supreme Court of the United States, a contagious sickness shall render it hazardous to hold the next stated session of the said court at the seat of government, it shall be lawful for the chief or such associate justice, to issue his order to the marshal of the district within which the Supreme Court is, by law, to be holden, directing him to adjourn the said session of the said court to such other place within the same, or an adjoining district, as he may deem convenient; and the said marshal shall thereupon adjourn the said court, by making publication thereof in one or more public papers, printed at the place by law appointed for holding the same, from the time he shall receive such order, until the time by law prescribed for commencing the said session. And the district judges shall, respectively, under the same circumstances, have the same power, by the same means, to direct adjournments of the district and circuit courts within their several districts, to some convenient place within the same, respectively.

Sect. 8. *And be it further enacted*, That the act, entituled, "An act relative to quarantine," passed in the first session of the fourth Congress of the United States, shall be, and the same is hereby repealed.

JONATHAN DAYTON,
Speaker of the House of Representatives.
THOMAS JEFFERSON,
Vice-President of the United States, and President of the Senate.
Approved, February 25, 1799,
JOHN ADAMS,
President of the United States.
Deposited among the rolls in the office of the Department of State,
TIMOTHY PICKERING,
Secretary of State.

ARTICLE IV.

Of the EPIDEMIC *lately prevalent in Boston. By* ISAAC RAND.

THE state of the atmosphere in the month of May was warm and pleasant. FAHRENHEIT's thermometer ranged from 48 to 82 degrees, at 2 o'clock, P. M. Twelve days the mercury

stood from 60 to 82. Nineteen days from 48 to 90, with alternate rain and sunshine. Some few persons laboured under rheumatism: some with asthma; and few had the typhus mitior this month.

June was pleasantly warm, with the winds for 17 days from S. and S. W. three days S. E. and E. four days the wind blew from the N. E. when the weather was cool and cloudy with rain. The remaining six days W. and N. It thundered with small showers the 3d and 29th. Thermometer ranged from 56 to 83, only one day 56. Twenty days, from 70 to 83. Nine days, from 65 to 70. Fevers, with inflammatory symptoms, pleurisy, bilious and inflammatory fevers, ophthalmy, and few cynanche parotidea.

July was hot and sultry. The S. and S. W. winds prevailed 18 days. Small showers with thunder 8th and 29th. The range of the thermometer was from 72 to 96, excepting three days it descended to 67. The typhus gravior, and in some instances the yellow fever.

August, the S. S. E. and S. W. winds prevailed 23 days. The remainder it varied from W. and N. W. to E. and N. E. It rained the 5th with thunder, 10th thunder, 12th small showers, 21st cloudy with thunder, 26th rain. Thermometer ranged from 72 to 94, the 20th and 23d, 67 and 69, healthy except the contagious fever.

September, light breezes from the S. W. S. and S. E. prevailed 22 days. Very little rain this month; part of this month hot and sultry. Thermometer ranged from 56 to 77. The night of the 29th a frost. The fever the latter end of this month abated.

October, the W. and N. W. winds blew 13 days: variable from N. E. to S. E. the remainder of the month. The 7th a great storm with much rain; a severe frost 29th, which arrested the further progress of the contagious fever. Thermometer from 30 to 56.

The epidemic, pestilential, or yellow fever, that prevailed in the town of Boston, in the summer and fall of 1798, appeared June 17, in a family which resided on Stoddard's wharf, consisting of eight persons; five had the fever, one died the 23d, another the 30th of the same month. Three recovered.

This wharf is situated between the Mill creek and Town dock. The dock is the receptacle of a large sewer, in which the cloacinæ of the county jail and the neighbouring houses discharge their contents; and is surrounded by warehouses, which contained a great number of raw hides from the West Indies, and the Cape de Verd Islands; and a large quantity of beef not sufficiently salted. The juices from the fresh beef and pork which were packed in the contiguous stores flowed into this dock. Besides, being in the vicinity of Faneuil Hall market, all the putrid meat and decayed vegetables

were thrown into it; and all the filth of Court-street, Cornhill, Hanover-street, Wing's-lane, Union-street, and Dock-square, flows into it. It is also surrounded with fishmonger's stalls; the offal of the fish, putrid fish, oysters and clams were thrown there.

Some few days previous to their seizure with the fever, a quantity of damaged salt and pickled fish was thrown into the creek at the back of Stoddard's house, which produced a very putrid exhalation.

Soon after its appearance on Stoddard's wharf, a few persons who resided near, or transacted business on the wharves inclosing Green's and Spear's docks, in the vicinity of the Town dock, were seized with the fever, and it spread among some persons who did business in the lower part of State-street and the Long-wharf.

The disease, the latter end of July, appeared at the foot and declivity of the south-east and south sides of Fort-hill, and made a fatal progress; scarce any family that resided below the summit on these sides of the hill escaped the fever. One family lost five persons out of six; and probably the greatest part of the inhabitants of that part of the town would have fallen victims to the disease, had not their fears impelled them to remove. I know of but one family that escaped the fever, that resided there the summer and fall. The husband did business from home, and the wife was far advanced in pregnancy. It was observed that pregnant women escaped the fever, although some nursed their husbands while sick with it, and others were exposed to the contagious atmosphere, through the whole season, but escaped the infection.

The hill is a solid mass of clay from its summit to its base, at the margin of the river, and is covered with but a few inches of mould. Its declivity, towards the south, renders the rays of the meridian sun perpendicular, and proportionably increases its heat.

The S. E. S. and S. W. winds prevailed most of the months of July, August, and September, which wafted the exhalations from the wharves, stores, and docks at the foot of the hill upon the inhabitants that resided on those sides of it.

This side of the hill has been built upon but a few years; the families, from their first residence, had thrown their waste water, impregnated with animal and vegetable substances, at their doors: and as the declivity of the surface soon made it disappear, they had no drains to convey it to the river. The clay prevented its penetrating further than the termination of the mould; so that the extreme heat of the meridian sun, and the increased heat of the last summer, exhaled a gas that might otherwise have lain dormant, and conspired with other causes to render the air of that part of the town peculiarly disposed to excite this fever. At the margin of the river, on the S. E. and S. sides of the hill, there was stored

a large quantity of salt fish, many half putrid raw hides from the West-Indies, and many barrels of beef. The first person who was attacked with the fever on Fort-Hill, was a man who had been employed in conveying some of the putrid salt fish from the stores into the channel of the river. Another man who had purchased semi-putrid hides, soon after removing them, was seized with the fever, and fell a victim to his temerity.

When the S. and S. W. winds prevailed, the contagious effluvia were conveyed round the hill into Battery March, Liberty Square, and Kilby-street. Their deleterious effects were increased by the exhalations from the very foul docks encompassing Liberty-Square, into which some putrid, unsalted fish had been thrown, and extended their baneful effects into the middle part of State-street.

The latter part of August, all September, and part of October, the fever raged at the north part of town, in Front-street, a narrow confined dirty street, fronting the E. and S. E. of the harbour, and exposed to the exhalations brought by the E. and S. E. winds, from the extensive flats, and extremely foul docks, from Hancock's wharf to the Town dock. It affected some persons in Cross-street, at the corner of which it first appeared, where a cellar, which had not been cleaned for some years, was so offensive, that a number of hogsheads of lime were strewed over it before any person could be induced to remove the dirt from it into the street, where it lay more than a week; during which time, the occupier of the house was seized with the fever, but being removed, recovered. A poor family, consisting of four persons, whose circumstances would not admit of its removal, was seized with the fever, and all died; two women living in the opposite corner probably received the infection from the same source, and died.

The last of September, and beginning of October, the wind shifted to W. and W. N. W. which conveyed the noxious exhalations from the Mill Pond into Back-street; where the fever seized a whole family, whose garden-wall was washed by the waters of the pond; and individuals of some other families were also attacked with it.

The inhabitants contiguous to the pond, and others, throw dead dogs, cats, putrid meat, fish, and rotten vegetables into it; and drown many small animals there: the filth of the streets flow into it in every direction, and it is the receiver of the vaults surrounding the pond.

The intense heat of the sun, acting on these substances, and the mud of the pond, generated a most destructive exhalation, which, during the prevalence of the S. E. S. and S. W. winds, were blown from the town; but as soon as the wind changed to the W. and N. W. their effects were fatally experienced by some families in Back-street.

The Mill Pond was often drained of its waters, so as to leave the mud with the putrid substances exposed to the action of the sun.

When the fever appeared in Back-street, the Selectmen were requested to order the water to be constantly retained in the pond; which being enforced, the fever soon ceased in that quarter.

The cloacinæ of the town were extremely offensive during the summer. Human ordure that has lain a long time in vaults, partly exposed to the sun, and undergoing a decomposition, emits a gas or exhalation highly destructive to human life.

The effluvia arising, while emptying a vault, that had been exposed to the action of the sun, produced the fever in Mr. Gordon, which proved fatal to him.

From information of some of the most intelligent merchants, there remained in the stores in this town, during the last summer and fall, an immense quantity of salt and pickled fish, part of them in a putrid state; and a great many barrels of beef semi-putrid, and exhaling a highly destructive vapor. These provisions were designed for the European and West-India markets; but, from the depredations committed on our commerce by the French, were not exported, and remained sources of poverty, sickness and death to many of our citizens.

The beef that is packed in Connecticut, and some other places, and sent to this market for sale, is put up in the fall and winter, with not one half the salt that is necessary to preserve it through the summer season; and when it is sold by the commission merchant, it is repacked; and not till then is the full proportion of salt added. Much of this beef was never disposed of, and was spoiled.

Three lads, apprentices to Mr. Marston the cooper, by repacking some of this beef, were seized with the fever, and all died.

The fish that is imported from Nova-Scotia and Newfoundland, I am informed, is cured with one third less salt than is used in the United States; and is more disposed to the putrefactive process in most hot seasons than the fish that is cured in these States.

The fever did not seem to be contagious from the deceased. I know of no instance of its being communicated to the nurses or attendants of the sick, in places where the disease was not originally contracted. But it appeared to be propagated by an impure local atmosphere, operating upon habits previously disposed to receive the infection.

Five persons, who were attacked with this fever in this town, were carried into the country. The fever, by the exercises and agitation, was increased, and proved fatal to all of them. No person received the infection from them.

Many of those, who were conveyed by water, after their seizure,

to Hospital-Island, in the lower harbour, recovered. None of the attendants sickened.

The atmosphere at the bottom of Cross-street, Fore-street, or Fish-street, the Town Dock, and on the S. E. and S. sides of Fort-hill, was so fully impregnated with contagion, as to be very perceptible to the smell and taste, exciting the same sensation in my mouth as a weak solution of corrosive sublimate of mercury, and very similar to the smell and taste of the effluvia from the confluent small-pox, just after maturation; and it constantly excited in me a salivation during my attendance upon the sick in those places. I ascribed, in some measure, my security from the disease to this effect upon the salivary glands.

Eleven persons, who were my patients, died, out of one hundred and three who were so very sick as to be confined to their beds with the fever: one of these was so suddenly seized as to die before any medicine operated upon him. I saw him but once before he died.

The Rev. Dr. LATHROP has favoured me with a letter from JEDEDIAH HUNTINGTON, Esq. of New-London, dated Dec. 10, 1798, respecting the epidemic fever which prevailed there the summer and fall of 1798.

"DEAR SIR,

"Since I wrote to you, I have examined a parcel of cod-fish to which much of our epidemic has been attributed. It had been spread several days before I saw it, so that it appeared in better condition than it otherwise would have done: Then, however, it was so rotten, as nearly to have lost the texture and taste of fish. I am told, that when it was in a pile, a yellow juice oozed from it, like to well-digested pus. There were other parcels of damaged fish in the vicinity, in the whole 120 quintals, part of which was cured, if the expression may be allowed, with less salt by one quarter than is generally used. Within a kind of parallelogram, formed by these parcels of fish, the fever originated, and within the same space, and the distance of an hundred yards from it, in several directions, it mostly prevailed.

"Some time previous to the first death, which was the 19th of August, at Bingham's Coffee-House, and which was followed by three other deaths in the same house, several gentlemen remarked, that there was, in that neighbourhood, an offensive smell in the air, although the ground there is, in the nature of it, and from long experience, proved to be very healthy, being elevated and dry, and open to the land and sea breezes. Besides these parcels of fish, which had given particular offence, there were other noxious matters which may be deserving a place in the account. The vault of a temple of Cloacina, belonging to the Coffee-House

before mentioned, mostly above ground, was, for some time previous to the sickness, nearly or quite full, and was inclosed with stone, which was not so tight as to prevent the liquid part from issuing at the joints. A few days after the first death, a parcel of damaged clams were thrown out of the Coffee-House on the head of a wharf contiguous, which yielded such an intolerable stench, that persons in a house close by were obliged to quit their places. How long the clams had been in the house in that state I do not learn. Another filthy substance on the ground in question was a heap, composed chiefly of the dung of cattle, with the sweepings of the decks of vessels, and which might occasionally become the receptacle of a dead cat or rat, or other putrescent matter.

"There is another circumstance which relates to the subject, and that is a scarcity of water in very dry weather. The trouble of procuring a supply probably induced several families to make long intervals between their washings of clothes, floors, &c. All these last mentioned matters combined might not have been powerful enough to produce any contagion; yet, in co-operation with the fish (if that article could produce it, as our best informed citizens and physicians are confidently of opinion), they, doubtless, aided in a more inveterate infection; and still it is probable that the effluvium of the fish, with all its auxiliaries, might, in common seasons, have been harmless.

"The general state of the weather here and at Boston, the last season, was, I apprehend, much the same. Ours was uncommonly hot and dry, the mercury being from 95 to 97° for several days in succession. The total of the deaths by the fever is 83; say one tenth or twelfth part of the inhabitants remaining in town."

The coincidence of opinion, in this judicious, well written letter, respecting the origin and cause of their fever and ours, is very striking, and tends to confirm the observations in the preceding narrative.

This fever attacked the patient most commonly with a violent pain in the head; a severe pain in the back and loins; pains and soreness in the muscles of the thighs and legs; a violent pungent heat, and burning sensation, and pain at the præcordia; sometimes with difficult respiration, seldom with rigors, often with violent heat over the whole surface of the body; a nausea and vomiting, moist tongue, besmeared with a whitish mucus. Some had most exquisite pains in the stomach and bowels, with frequent vomiting of fluid blood mixed with bile. The nausea and vomiting, in some, continued until death closed the scene.

The eyes were affected with a burning heat, often suffused

with tears; the tunica conjunctiva, or white of the eyes, was of a yellowish red colour: the vessels of this tunic were much distended; and the pupils, in some, were dilated. Some, whose pains and heat were very severe, had an appearance on the surface of the body resembling the suffusion of blood, which accompanies the fever preceding the eruption of the confluent small-pox, with petechiæ and ecchymosis, and seemed to arise from the same rapid circulation of the blood in the evanescent arteries, often effusing the blood into the cellular membrane, producing purple spots.

The pulse was commonly full; sometimes hard and accelerated: some few had a small, oppressed pulse; some laboured under great anxiety, restlessness, and jactation. The skin was sometimes dry, but oftener moist. Costiveness often prevailed through the whole of the disease. Some were so insidiously seized, that they were scarcely sensible of their sickness, before they succumbed under the magnitude of the disease.

The blood, as it flowed from the veins, was of a dark purplish colour, similar to blood of drowned or suffocated persons, before respiration is restored. It soon coagulated, and was not sizy, and had a shining, greasy appearance on its surface. After a separation of the crassamentum, the serum was yellowish. Only one person, of more than an hundred, who lost blood in the first twenty-four hours after the attack, had sizy blood. He had arrived from sea but twenty-four hours before his seizure with the fever. He lost, at three bleedings, near forty-eight ounces of blood, which was florid and sizy. After the third bleeding, the pains in his head, back and loins, the burning at the præcordia, the nausea and vomiting, greatly abated; and, after the operation of the cathartic mixture, he retained his mercury. It soon affected his mouth; his distress, anxiety, and jactation vanished, and he was free from fever the fifth day.

Some few, at the first attack, were torpid and drowsy, sensible of little or no pain, with fluid, blackish blood, oozing from their nostrils and mouth; and some discharged urine tinged with blood: but, in general, the urine was little altered from a natural state.

The pain in the head, loins and back, with the hard, full, and accelerated pulse, continued from two to four days, when the pains commonly ceased; the pulse lessened from 110 and 100, to 75, 70, and sometimes to less than 60 in a minute. The extreme heat descended below the natural standard, and, when the disease proved fatal, was succeeded by a coldness of the extremities, a clammy sweat, a low delirium—harbingers of death. The burning at the præcordia, anxiety, distress, and jactation, often continued till death ensued.

The crisis of the fever was on the third, fifth and seventh days in recovery. It terminated fatally on the second, fourth, and sixth days. Only two, of eleven persons who died, survived the sixth day of the disease. The skin, at these stages of the disease, had often a yellowish tinge; and, in some, it had as deep a yellow as a Seville orange: in many, however, it retained its natural colour. The subjects of the disease were the active, athletic, middle aged men; some few women, and scarcely any young children. The appearances of the internal organs, upon opening the bodies of three who died of this fever, have been published in the *Centinel* and *Mercury*, September, 1798.*

Method of Cure.

The young and athletic, at the commencement of the fever, were bled from sixteen ounces to twenty-four; some lost forty-eight ounces of blood, which relieved the pains in the head and back, often suspending the nausea and vomiting.

The pains in the stomach and intestines, the heat at the præcordia, were diminished by liberal evacuations, procured by a solution of Rochelle salts and manna, each two ounces, dissolved in one pint of tamarind-water, and a cupful taken every hour, till liberal evacuations ensued. If the stomach nauseated at this cathartic mixture, clysters were administered, composed of water-gruel, Glauber's salts, castor oil and molasses, which seldom failed lessening the nausea and retching of the stomach.

Sometimes it was necessary to cleanse the stomach, when there was a predominance of acrid bile, by camomile tea or warm water; and to compose the convulsive motions of that organ, after evacuations, with small doses of laudanum liquid in mint tea, or the anti-emetic mixtures, and fomentations of mint and camomile to the region of the stomach. Emetics were dangerous in the inflammatory stage of the fever.

After the intestines were evacuated, two or three grains of calomel were administered every two hours, or every hour, according to the urgency of the symptoms, to excite a salivation; and, upon the appearance of this effect of mercury, the dangerous symptoms vanished.

Scarcely any patient, where the effects of the mercury upon the salivary glands were evident, but what recovered. Sometimes it was necessary to add a small dose of opium to the calomel, to prevent its evacuation by the bowels, and ensure its effects upon the salivary glands.

The salivation was continued until the crisis was accomplished. If the nausea and vomiting could not be allayed, and the mercury was rejected, attempts were made to affect the system and mouth

* See Medical Repository, vol. ii. p. 249.

by rubbing two drachms of the strong mercurial ointment on the region of the liver, the insides of the thighs and legs, three times a day, until a salivation was excited. During the mercurial course, clysters were administered, to promote a discharge from the bowels: they were a warm fomentation to the contents of the abdomen, and conduced to the ease of the sick in every stage of the disease.

Nothing contributed so much to allay thirst and cool the body as thirty drops of Clutton's febrifuge spirit in cold water, between the doses of calomel: besides being grateful, it composed the jactation, and was often sedative at night.

If the respiration was difficult, and the pains in the sides, diaphragm, and mediastinum, were not removed by venesection and cathartic evacuations, large blisters were applied immediately over the affected parts, which often afforded relief, and gave a truce to the disease till the mercury had affected the system.

Blisters also gave the most certain and permanent relief from the pain and inflammation of the cardia, pylorus, and intestines. If delirium supervened, they were applied to the temples and forehead with success, removing the pain and delirium.

In the first stage of the disease, before the application of blisters, every part in pain was frequently washed with cold water and vinegar.

The sick were indulged with cold lemonade, barley-water, with lemon-juice, small-beer, and cider and water. The beverage that was most agreeable to the greatest number of sick, and oftenest retained, was cold water from the well.

The fruits of the season were taken as often as the stomach would admit. New milk, with weak lime-water, was often tried to allay the pungent heat and retching of the stomach, without success.

When the second stage commenced, the morbid action of the system lessened; the pulse lost its frequency and strength; the skin grew cool, much below the healthy standard. Blisters were then applied to the wrists, and inside of the calves of the legs; and bricks, immersed in boiling vinegar, to the insides of the thighs and soles of the feet. The body was encircled with blankets, to diffuse the circulation, and divert the impulse of the fluids from the internal organs to the superficies, and excite a sweat. Warm wine whey, weak warm punch, sage tea, warm chicken broth, and every animating, grateful drink, were given to encourage and support it. In this stage the sick were confined to their beds, and not permitted to rise till the crisis was over. Two persons, who were apparently so far recovered on the sixth day as to be out of danger, arose from their beds, were dressed, and walked through a suite of two rooms, and remained there some

hours, were seized with a faintness and low delirium, which proved fatal to both.

After the subduction of the stimulus of the disease, the heart is scarcely able to propel the blood, in a perpendicular position, to the head; a faintness succeeds; the balance between the heart and circulating mass is lost; and death ensues.

After the crisis the patient returned cautiously to his usual mode of living.

Through the whole of the disease attention was paid to personal cleanliness: the chambers were perflated, and the purest air that the situation of the sick would admit was indulged.

The fever, in many persons, was not so violent as to require these Herculean remedies, but was cured by a few doses of Rochelle or Glauber's salts, senna and manna, abstinence from animal food, and stimulating liquors; rest, and exciting a gentle perspiration, by free dilution, with any agreeable liquor; lemonade, cold water, and Clutton's febrifuge spirit.

A greater proportion of those who were violently seized with the fever, and early underwent large evacuations by venesection and cathartics, recovered, than of those who were insidiously attacked, and deferred medical aid till the second or third day. Many of those who puked fluid blood, and discharged it from the bowels, recovered. Might not the disease, when seated in the membranes of those organs, have the inflammation removed by the evacuation of fluid blood? But when the disease affected the organs themselves, it proved more refractory, and eluded the efforts of medicine.

I saw no person with carbuncles; a few with petechiæ.

It may be asked, if mercury was so efficacious in this fever, why did so many fall victims to it? It is supposed, that when the disease affected any organ or membranous part, terminating in suppuration, it proved fatal. It has been observed by physicians, that the lesion of an internal organ has frustrated the salutary effects of mercury. Our dissections discovered, in each subject, a lesion of very important organs.

Self-love biasses us in favour of the salubrity of our air and native soil, and gives rise to the opinion, that contagious and epidemic diseases are imported. But it is now almost reduced to a certainty, that the putrid fevers and plagues which raged in Europe, in former centuries, had a domestic origin. I shall recapitulate the causes which gave rise to the fever which prevailed in the summer and fall of 1798, in this town.

Causes.

1st. The exhalations from the docks, and the sewer that empties itself into the Town Dock.

2dly. The putrid beef and pickled fish that were repacked late in the summer: the semi-putrid salt fish that was thrown into the Mill Creek; and the putrid animal and vegetable substances, uniting with mud in the Town Dock, Green's and Spear's Docks.

3dly. The putrid raw hides and damaged fish in the stores at the foot of Fort-hill.

4thly. The unsalted fish which had been carelessly left in the fish-stall in Liberty-square, till it had attained to the destructive stage of the putrefactive process, and was the cause of the fever and death of Mr. Josiah Bradlee.

5thly. The effluvia from the cellar at the corner of Cross-street; and from the foul and extensive flats and docks from Hancock's-wharf to the Long-wharf.

6thly. The putrid animal and vegetable substances mixing with the mud and filth of the Mill-pond.

7thly. The putrid human ordure, emptied out of the vaults in the night, and which is often scattered over the streets, from the cloacæ to the docks; and from the great number of hogs, kept, through the summer, in narrow and confined yards and pens.

8thly. The carelessness of the inhabitants in permitting the dirt, with putrid meat and fish, to accumulate in their yards; and dead carcases, fish, &c. to lie in every street in the town during the summer; and vaults overflowing and exposed to the action of the sun.

These causes of disease can be obviated by wise laws, energetically executed.

The causes of the late fever were arrested by the frost: they had not expended their destructive effects; they only are suspended till the heat of the summer shall bring them into operation again.

The evils are incalculable to populous and commercial cities, in the loss of citizens and suspension of commerce during the prevalence of contagious diseases. It, therefore, requires the united efforts of the patriotic, the opulent and wise, in carrying into execution such regulations as may militate with the present interest of some, the prejudice and avarice of others.

I would, therefore, propose, that no beef nor pickled fish be repacked in this town, and that no raw hides be stored in the town, from the first of May till the last of October; that every householder be obliged to clean his yard, and before his house, every other day, during the summer and part of the fall;—and that public carts convey the dirt to some distant part of the town, or by water to some island; and be prohibited, by severe penalties, from throwing any offal of fish, putrid meats, or carcases of animals, decayed vegetables, or other offensive putrescible substances, into the streets, lanes, or alleys;—that the contents of

no vaults shall be emptied into the docks, nor at the ends of wharves, but shall be conveyed, in large casks, in a public boat, below the Castle, and discharged into the river at the beginning of ebb tide;—that those docks which the water covers but a few hours in the twenty-four be filled up, and all the other docks cleansed, before the last of April, from every substance capable of producing a putrid exhalation;—that no more houses be built in narrow, confined lanes, courts or alleys;—that it be recommended to the inhabitants of this town, to indulge less in animal food and spirituous liquors in the summer and fall than at other seasons of the year, and use a larger proportion of vegetable and farinaceous substances at their meals at those seasons than at others;—that the communication, by drains or pipes, from the vaults of the county prison, and from private houses and stores, into the town or common sewer, be cut off, and the apertures of the sewer be closed by valves that will permit the water to flow off, but prevent the escape of the destructive exhalations from the sewer into the streets;—that no oysters nor clams be permitted to be sold in this town from the first of May till the first of October.

And as it would cut off a source pregnant with evils, it be enjoined upon the fishermen, that they kill their fish, take out their gills and entrails as soon as they are taken, and throw the gills and guts into the river or sea.

Physiologists and epicures know, that the convulsions that precede the lingering death of fish, destroy the firmness of the texture of the fibres, and deprive them of their sweet and luscious taste.

It appears from the returns made to the Selectmen by the physicians, and the undertakers, that there died of this fever, from June 23, 1798, to October 22, *one hundred and forty five persons.*

From the number of families which I usually attend when sick, that moved out of the town, I conjectured nearly eight thousand inhabitants left the town during the sickness.

January 30, 1799.

END OF VOLUME II.